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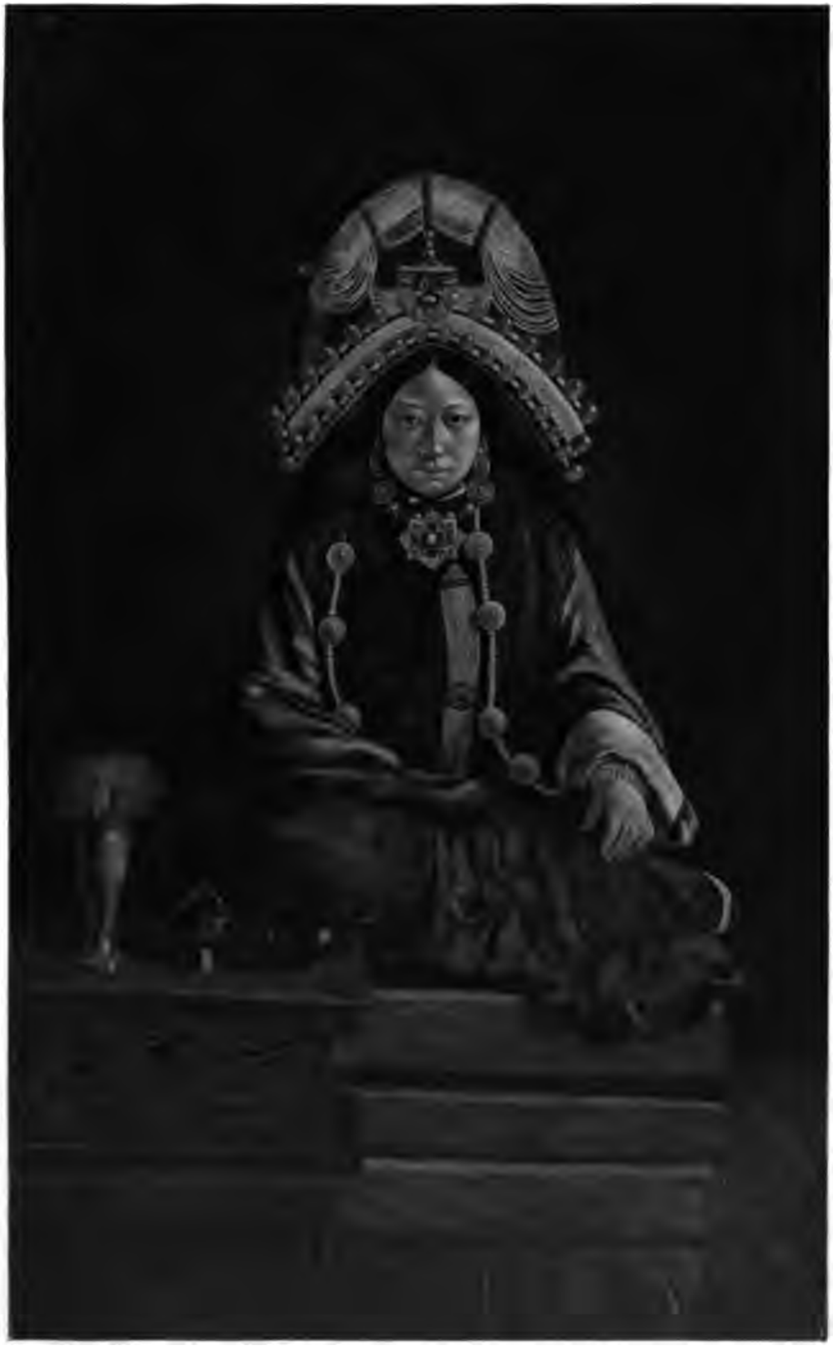

PORTRAIT OF THE QUEEN OF SIKKIM.

PLATE I

The reigning queen (Mahārānī) of Sikkim, after an oil-portrait by Damodar Dutt, a Bengali artist, in the collection of the Field Museum (Cat. No. 117815, acquired by the writer at Darjeeling in 1908). The queen is a full-blooded Tibetan princess born at Lhasa in 1864 and was married to the present king of Sikkim as his second wife in 1882. Both were taken prisoners by the British in 1893 and held in captivity at Darjeeling. During that time she used to sit to the Bengali painter for the portrait in question which was completed in 1908. The writer had an audience with her in her palace at Gangtak, the capital of Sikkim, at which time she was dressed in the same state-attire and with the same jewelry as in this painting. Her crown, the peculiar headdress adopted by the queens of Sikkim, is composed of broad bandeaux made up of pearls, interspersed with turquoises and corals alternating. Her gold earrings are inlaid with a mosaic of turquoises in concentric rings. The necklace consists of coral beads and large yellow amber balls, and has a charmbox (*gau*) attached to it, set with rubies, lapis lazuli and turquois. She wears a bracelet of corals and two gold rings set with turquois and coral.

Mr. J. Claude White, the British Political Officer of Sikkim (in his book "Sikhim and Bhutan," p. 22, London, 1909) characterizes her as a striking personality, extremely bright, intelligent, and well educated; her disposition, he says, is a masterful one, and her bearing always dignified; she is always interesting, either to look at or to listen to, and had she been born within the sphere of European politics she would most certainly have made her mark, for there is no doubt she is a born intriguer and diplomat.

Another oil-portrait in the Field Museum from the hands of the same artist represents the Mongol Lama Shes-rab rgya-mts'o ("The Ocean of Wisdom") born in 1821 at Kūkā-khota ("Blue City," in Shansi Province, China), teacher to the Pan-ch'en Lama, then interpreter in the Anglo-Indian Civil Service; he was distinguished for his Tibetan scholarship, particularly in the department of astronomy and astrology; he did useful work in assisting English translations of Tibetan books, and died at Darjeeling in 1902, at the age of eighty-one. Damodar Dutt received for this portrait a medal from the Bombay Art Exhibition.

Dimensions of above portrait: 1.74 x 1.06 m.

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NOTES ON TURQUOIS IN THE EAST

BY

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Associate Curator of Asiatic Ethnology

FIELD MUSEUM · OF NATURAL HISTORY ·

CHICAGO, U. S. A.
July, 1913.

PREFACE

In April, 1911, Dr. Joseph E. Pogue, mineralogist in the U. S. National Museum of Washington, requested my co-operation in bringing out an extensive monograph which he contemplated on the turquois from the mineralogical, historical, and ethnological points of view. It was originally intended that the following notes should be embodied in the form of an appendix in Dr. Pogue's proposed work which I understand is now complete in manuscript. As adverse circumstances beyond the control of the author have unfortunately delayed for the last two years the publication of his study, and as a recent official journey to Alaska will prevent for some time longer active operations on his part, my contribution to his work is herewith issued in a separate form. It should be understood that only the exhaustive monograph of Dr. Pogue, which it is sincerely hoped will come out in the near future, will lend these notes their proper background and perspective. As at one time a plea was made by me for the co-operation of naturalists and orientalists (*Science*, 1907, p. 894), it is gratifying to note that we have advanced a step farther in this direction, and it will be seen on the following pages that oriental research can also bring to light new and not unimportant facts as yet unknown to our natural science. The occurrence of the turquois in Tibet and China, and to a higher degree, its history and cultural position in those countries, present a chapter of knowledge with which our mineralogists have been hitherto unacquainted. But only concerted action and sympathetic co-operation can lead us to positive and enduring results. The orientalist needs the naturalist as much as the latter, when his inclinations carry him to Asia, may profit from the stimulus of the former, in that he can suggest and encourage problems, the solution of which will turn out to be of vital significance to archæology. Our mineralogical knowledge of Eastern and Central Asia is in a very unsatisfactory condition, and it is desirable that the horizon of our mineralogists should no longer be bordered by the Panama and Suez canals. There is a great and promising field open between the two, and a plan which a mineralogist should follow in aiding the cause of archæology in Asia is briefly indicated on p. 54.

For various information I am under obligation to Dr. Friedrich

Hirth, professor of Chinese at Columbia University, of New York; to my friend Paul Pelliot, professor at the Collège de France in Paris; to Prof. Georg Jacob at the University of Kiel; and to Dr. Julius Ruska at the University of Heidelberg. The contributions courteously made by these gentlemen are clearly acknowledged as such in each particular instance.

BERTHOLD LAUFER.

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NOTES ON TURQUOIS IN THE EAST

By BERTHOLD LAUFER

I. Turquois in India

The peoples of ancient India do not seem to have been acquainted with the turquois,[1] nor do they possess an indigenous word for it. The Sanskrit term *peroja* (also *perojā*, *pīroja*) or *perojana* is a comparatively recent loan word of mediæval times derived from New-Persian *ferozah* (older form *fīrūzag*), from which also the Russian word *biruza* and Armenian *piroza* come;[2] and the Sanskrit designation *haritāçma* is a compound with the meaning "greenish stone." The older Sanskrit treatises on precious stones do not make mention of it. Neither Buddhabhaṭṭa, a Buddhist monk who wrote the *Ratnaparīkshā*, that is, the "Appreciation of Gems," [3] presumably before the sixth century

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[1] Our name *turquois* (from French *turquoise*, Old French also *tourques*) means Turkish stone (there is also the word Turkey-stone, formerly turky-stone), not because the stone is found in Turkey, but because the most reputed kind, coming from Persia, first reached Europe by way of Turkey; the Venetians seem to be the first to have imported it (Italian *turchese*), and also to have made of it imitations in glass. The Latinized names were *torcois*, *turcosa*, *turchina*, or *turchesia*, and A. Boetius de Boot, court physician to Emperor Rudolf II (Gemmarum et lapidum historia, ed. A. Toll, p. 265, Lugduni Batavorum, 1636; the first edition of this interesting work appeared at Hanover in 1609) states: "Omnibus nationibus eo nomine notissima, quod a Turcis ad nos feratur." Others hold that the allusion to Turkey in the stone implies no distinct geographical notion but vaguely means "coming from the Orient" (O. Schrader, Reallexikon der indogermanischen Altertumskunde, p. 153, Strassburg, 1901); indeed, Turkey was for a long time a term of uncertain value, almost having the meaning of "strange," and was even connected in Europe with two American products,— our North American bird, and maize (sometimes known as Turkish wheat). At any rate, the Turks were acquainted with the turquois, in particular with that of Persia, calling it by the Persian name *firuze*. According to a kind communication of Prof. Georg Jacob, the turquois is described in a Turkish work on mineralogy written in 1511–12 A. D. by Jahjà Ibn Muhammad al-Gaffārī (manuscript in Leipzig, Catalogue of Fleischer, p. 508, No. 265). Five principal kinds are distinguished: Nishapuri, Gaznewi, Ilaqi, Kermani, and Khārezmi; the first, the well-known turquois from Nīshāpūr in Persia, is regarded as the most valuable, being hard, and fine, and permanent in color; the various sorts are described and followed by reports of celebrated turquoises in the history of Islam.— Shakespeare (*The Merchant of Venice*, Act III, Scene I, in the folio edition) has the spelling *Turkies;* the poet Tennyson adheres to the old form *turkis* (Middle English *turkeis*, on a par with German *türkis*, Middle High German *turkoys*, *türkīs;* in the seventeenth century, *turkes*). The usual English spelling, in accordance with French, is *turquoise* (formerly it was written also *turcois* and *turkois*); in scientific writings in this country the spelling *turquois* is now generally adopted.

[2] The Persian turquois is not discussed here, as it will be treated by Dr. Pogue in his monograph. The course of our investigation, however, necessitates touching also upon this subject, and some brief notes bearing on it will be found on p. 38.

[3] Edited and translated by Louis Finot, Les lapidaires indiens (Paris, 1896).

A. D., nor *Varāhamihira* (505–587 A. D.) in his work *Bṛihatsaṃhitā* allude to the turquois. Agasti, in his versified treatise on gems, the *Agastimata*, and a very late work, the *Ratnasaṃgraha*, each devote a stanza to the turquois.[1] The date of the former work is not satisfactorily established. Inward evidence leads one to think that it is posterior to the sixth century A. D., and that a work under this name possibly existed in the thirteenth century, while in its present shape it is, in all likelihood, of much later date. Of greater importance is the little mineralogical treatise *Rājanighaṇṭu* written by Narahari, a physician from Kashmir, not earlier than the beginning of the fifteenth century. According to Narahari, the two words as given above are used to distinguish two varieties of the stone, as the hue is either ash-colored or greenish. He remarks that it is astringent and sweet to the taste, and an excellent means to provoke appetite; every poison, whether vegetable or mineral, or a mixture of both, is rapidly neutralized by turquois; it also relieves the pain caused by demoniacal and other obnoxious influences.[2] As, in all likelihood, the acquaintance of the Indians with turquois was conveyed to them by way of Persia, it seems highly probable also that their beliefs in the medicinal properties of the stone, were at least partially derived from Mohammedan lore.[1]

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[1] L. Finot, *l. c.*, pp. 138, 197.

[2] Compare R. Garbe, Die indischen Mineralien, p. 91 (Leipzig, 1882). In the introduction the date of Narahari's work is calculated at between 1235-1250; Prof. Garbe has been good enough to inform me that he has now arrived at the conclusion that the work cannot be earlier than the fifteenth century. The turquois, accordingly, appears on Indian soil very late during the middle ages, in the Mohammedan period. The evidence gathered from mineralogical literature is corroborated by the records of Indian medicine. The famous Bower Manuscript assigned to the year 450 A. D., the brilliant edition and translation of which has just been completed by Dr. A. F. R. Hoernle (Calcutta, 1893–1912), does not make any mention of turquois, nor do the ancient physicians of India. (For this reason, J. Jolly, Indische Medicin, does not note the stone.)— It is asserted on the authority of the *Periplus Maris Erythræi* (Ch. 39), a Greek work of an unknown author from the latter part of the first century (probably written between 80–89 A. D., roughly about 85; see the recent discussion of the date by J. F. Fleet, *Journal Royal Asiatic Society*, 1912, pp. 784–7) that turquois was exported from the Indian port Barbaricon. Mr. W. H. Schoff, in his new translation of the work (The Periplus of the Erythræan Sea, pp. 38, 170, London, 1912), feels very positive on this point, and explains that "the text has *callean* stone, which seems the same as Pliny's *callaina* (xxxvii, 33), a stone that came from 'the countries lying back of India,' or more definitely, Khorassan; his description of the stone itself identifies it with our turquois, etc." This opinion, however, is more than hypothetical. First of all, as already pointed out by Lassen (Indische Altertumskunde, Vol. III, p. 14, Leipzig, 1858), it is doubtful whether the *kallcanos* of the *Periplus* is identical with the *callaina* of Pliny, because the localities where, according to the latter, the stone is found are too remote from India to make it possible for it to have been exported from the port of Barbaricon at the mouth of the Indus. Secondly, the supposed identification of Pliny's *callaina* or *callais* with the turquois is no more than a weak guess, and one that is highly improbable; and a mere guess, even though it may be repeated by a dozen or more authors, will never become a fact. It is said in Daremberg and Saglio (Dictionnaire des antiquités grecs et romains, Vol. II, p. 1463): "On suppose que c'est la turquoise;" and H. Blümner (Technologie und Terminologie der Gewerbe und Künste bei Griechen und Römern, Vol. III, p. 249, Leipzig, 1884) justly concludes that the evidence does not by any means seem to be sufficient to establish the identification of the turquois with the *callais* of the ancients as a positive fact. The vague "description" given by Pliny (XXXVII, 110–2, 151) of the stone bears out no striking reference to the

From an interesting text of the Arabic traveler al-Berūnī (973–1048) translated by E. WIEDEMANN [2] we now see that Persian turquoises were indeed exported from Persia into India, for the Arabic author remarks in his notes on the *fīrūzag* (turquois) that the people of Irāg prefer the

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turquois, its main characteristics not being at all set forth, and may suit many other stones as well; the pale green color (*e viridi pallens*) and the attributes *fistulosa ac sordium plena* by no means fit the Persian turquois which owes its reputation to its deep-blue tinge and its purity, nor has turquois the color of the emerald; the localities pointed out by him (nascitur post aversa Indiæ, apud incolas Caucasi, montis Hyrcanos, Sacas, Dahas) rather militate against the turquois. Mr. Skoff's hint at Khorāsān (not given by Pliny, who only alludes to Carmania) is a somewhat arbitrary opinion prompted by the desire to suit the convenience of his case. The principal point at issue, however, is that there is no evidence for the alleged mining of turquois on Persian soil in the first century A. D. (see p. 40) merely presumed but not proved by Mr. Skoff and his predecessors. If Pliny had known about the quarrying of turquois in Khorāsān, he would have plainly stated the fact with an undisguised reference to Persia or that particular province; but there is not one classical author with a knowledge of Persian turquois, nor is there any evidence proving that turquois was traded from Persia into Greece and Rome. The tradition of India incontrovertibly shows that the Persian turquois, both in its name and as a matter, appeared in India only as late as the Mohammedan period, and the negative evidence of archæology lends further support to this conclusion. Enough archæological work has been carried out in India to prompt us to the positive statement that, despite the numerous precious stones discovered in ancient graves, no find has ever yielded a single turquois. The jewels, for example, in the burial-place of Buddha at Pipravā discovered by W. C. PEPPÉ (*Journal Royal Asiatic Society*, 1898, p. 573; RHYS DAVIDS, *ibid.*, 1901, p. 397; G. OPPERT, *Globus*, Vol. LXXXIII, 1903, p. 225) were carnelian, conch, amethyst, topaz, garnet, coral, and crystal. A similar state of affairs in regard to the Persian turquois, as will be seen on p. 56, obtains in China where the turquois of Nīshāpūr and Kermān became known very late in the middle ages, during the Mongol period of the fourteenth century. It is thus plainly indicated by these two coincidences in India and China which cannot be merely accidental that it was only the Arabs, and after the conquest of Persia in 642 A. D., who imported the turquois from Persia into India and China; and the fact is quite certain that only in this late period the Persian turquois began to conquer the market of the world. There is, accordingly, no reason whatever to interpret the stone in question mentioned by the *Periplus* as the Persian, or any other turquois. The best supposition would be to recognize in the word of the Greek text, as in so many others of the *Periplus*, the transcription of an Indian word (compare J. BLOCH in *Mélanges Sylvain Lévi*, p. 3, Paris, 1911), presumably Sanskrit *kalyāṇa*, "good, fine, excellent," which is one of the attributes of gold (R. GARBE, Die indischen Mineralien, p. 33), or in the form *kalyāṇaka* is used with reference to medicines (compare also *kalyāṇī* and *kalyāṇikā*, "red arsenic"). See also p. 41, note 6.

[1] On the other hand it should not be overlooked that certain notions entertained regarding turquois among the Arabs and persisting later in Europe are absent in India and Tibet. Among these are the employment of the stone as an eye-remedy and against the stings of the scorpion, the latter idea first appearing in the Greek physician Dioscorides of the first century (compare L. LECLERC, Traité des simples par Ibn el-Beithar [1197–1248], Vol. III, p. 50, *Notices et extraits des manuscrits de la Bibliothèque Nationale*, Vol. XXVI, Paris, 1883, J. RUSKA, Das Steinbuch des Aristoteles, p. 152 [Heidelberg, 1912], and BOETIUS DE BOOT, *l. c.*, p. 270).

[2] Ueber den Wert von Edelsteinen bei den Muslimen (*Der Islam*, Vol. II, 1911, p. 352).

smooth ones, those of India like the round ones with convex surface.[1] This is so far also the earliest testimony for the presence of the turquois in India.

The fact that turquois is absent from India is confirmed by the negative testimony of the great merchant traveler JEAN BAPTISTE TAVERNIER (1605–1689), who, as a dealer and expert in precious stones, repeatedly traveled in India and became thoroughly familiar with the customs of that country. He writes in chapter nineteen of his Travels:[2]

> "Turquoise is only found in Persia, and is obtained in two mines. The one which is called 'the old rock' is three days' journey from Meshed towards the north-west and near to a large town called Nichabourg (Nīshāpūr); the other, which is called 'the new' is five days' journey from it," etc.

Tavernier would have certainly known about the existence of turquoises in India if they ever occurred there *in situ*. The various reports of modern travelers that turquoises are imported from India into Tibet are therefore to be interpreted in the sense that these Indian turquoises have been imported from Persia.

Also MAX BAUER [3] states that turquois is not found in India, Burma and Ceylon. But the same author does not note its occurrence in Tibet and China.

Abul Fazl Allami [4] (1551–1602), in his history of Akbar, enumerates among the precious stones in the treasury of the emperor rubies, diamonds, emeralds, and pearls, but not turquois. Turquois seems to have been everywhere an ornament of the people, but not one of royal personages.[5]

In the modern jewelry of India the turquois is utilized to some extent in connection with pearl, ruby, diamond, sapphire, topaz and emerald, set in silver or gold.[1]

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[1] The opinion formerly prevailed in Europe that the turquois was found in India because it was exported from there. This was the view of FRANCISCUS RUEUS (De gemmis aliquot, p. 54 b, Tiguri, 1565); but the turquoises exported from India were in fact derived from Persia.

[2] Ed. of V. BALL, Vol. II, p. 103 (London, 1889).

[3] Precious Stones, p. 397 (London, 1904).— G. WATT (A Dictionary of the Economic Products of India, Vol. VI, p. 204, London, 1893) says after the Manual of Geology of India: "The existence of the true turquois in India is doubtful. From the presence of blue streaks in the copper ores of Ajmir, Mr. Prinsep suggested the possibility of the stone being found there. Subsequently Dr. Irvine reported its existence in these measures, but, according to Ball, the so-called turquoises of Ajmir are only blue copper ore."

[4] The Ain I Akbari, translated from the Persian by H. BLOCHMANN, Vol. I, p. 15 (Calcutta, 1873). The original was published in 1597.

[5] Compare p. 30, note 3. In the Arabic account of Abu Zeid of the ninth century (translated by M. REINAUD, Relation des voyages faits par les Arabes et les Persans dans l'Inde et à la Chine, Vol. I, p. 151, Paris, 1845) it is said: "The kings of India are in the habit of wearing ear-pendants consisting of precious stones mounted on gold; they wear necklaces of the highest price composed of red and green stones of the first quality. But it is the pearls on which they place a greater esteem, and which are eagerly coveted by them; these now form the treasure of the sovereigns, their principal wealth."

II. TURQUOIS IN TIBET

As jade is the recognized jewel of the Chinese, so turquois is the standard gem of the Tibetans. In the eyes of the Chinese jade is not a stone, but forms a distinct class *sui generis*, as is shown by such constant phrases uttered from the lips of stone dealers: *shi yü pu shi shï-t‘ou*, "it is jade, it is not a stone."[2] To call a turquois a stone means an offense to the Tibetan, and he will exclaim indignantly, *di yú re, dó ma re*, "this is a turquois, and not a stone." The Tibetan word for turquois, *gyu* (pronounced *yu*, without sounding the prefix *g*, which, however, appears in the Mongol loan word *ughiu*)[3] is indigenous property, being derived neither from Sanskrit nor Chinese; it shows that turquois must have been known to the Tibetans since remote times. There are, doubtless, also many ancient turquoises still in their possession as they are inherited from mother to daughter for generations, and thus kept as heirlooms in the same family for centuries; being constantly exposed to the open air, they readily change color and often assume a pale green shade, more or less tainted with black spots.

Two special sorts of turquoises are called *drug-dkar* and *drug-dmar*, that is, white *drug* and red *drug*; the word *drug* designates the number 6, and the two terms are explained to designate very fine kinds of turquoises supposed to be one-sixth part white or red in tint, respectively. DESGODINS, in the Tibetan Dictionary published by the French missionaries, translates the two by white and red sapphire, but also reminds us of the fact that the native dictionaries interpret them as *gyu* "turquois." While I have encountered a great number of turquoises with white and black veins and streaks, I have never seen any with a red tinge.[1] This classification of turquoises is contained in the ancient Tibetan medical work known under the abbreviated title "The Four Tantra"[2] (*rgyud bži*, Peking edition, Vol. II, fol. 145 b). The literary history of this interesting work remains to be made out.[3] Originally based on a standard Sanskrit work translated into Tibetan in the middle of the eighth century, it passed through the hands of several distinguished Tibetan physicians who revised and increased the work considerably. It contains not only information on Indian anatomy, pharmacology and therapeutics, but also valuable material with respect to the natural products of Tibet and Mongolia. The manifold subsequent interpolations render the utilization of these notes for historical research exceedingly difficult when the question arises as to the time to which they must be referred. A literal translation of the notice regarding turquois runs as follows:

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[1] G. C. M. BIRDWOOD, The Industrial Arts of India, Vol. II, p. 25. In the Higinbotham collection of jewelry in the Field Museum there are several fine specimens of Indian jewelry in which turquois is employed, collected in India by Mr. Lucknow de Forrest of New York. G. WATT (*l. c.*) remarks that the turquois is largely used by the natives of India in jewelry but that imitations are perhaps more generally employed than the true stone. While I do not deny that such imitations may occur, I do not believe that they are very generally in use.—Aside from the mineralogical treatises quoted above, as far as I know, the word for turquois has not yet been pointed out in any other work of Sanskrit literature. The Sanskrit romance Vāsavadattā by Subandhu of the seventh century (translated by L. H. GRAY, pp. 85, 109, *Col. Un. Indo-Iranian Series*, Vol. VIII, New York, 1913) mentions a necklace of pearls and sapphires, further emeralds and rubies, diamonds and other stones, but not turquois, which, as shown also by such passages, was a late intruder in such combinations as stated above, and alien to the artistic taste of India.

[2] The agate (*ma-nao*) is, in the eyes of the Chinese, "neither a stone nor a jade," but a thing for itself.

[3] In more ancient texts the word is written also *rgyu*, thus showing that in the ancient pronunciation also the *g* was sounded. A singular word for turquois is the Mongol *kiris* which has thus far been pointed out but once in literature (LAUFER, *T‘oung Pao*, 1908, p. 431), and which presumably represents the ancient Mongol word for the turquois in times before the introduction of the Tibetan loan word.

"The turquois, in general, represents one species with two varieties, — that of best quality and the common one. Of the former there are two kinds, the one blue and white, of great lustre, called *drug dkar;* the other blue and red, of great lustre and polished, called *drug dmar.* There is, thirdly, a turquois of superior quality excelling the others in splendor, known as the turquois *sbyad,* 'beauty.' The common ones are 'the intermediate turquois resembling the *drug dmar,*' and 'the blue turquois resembling the *drug dkar.*' There are, further, the Indian turquoises originating abroad, and others. They entirely remove poison and heat of the liver. Substances belonging to the class of turquois and rock-crystal are so-called elements not fusible."[4]

If it could be proved with certainty that this note in the present tenor was already contained in the Sanskrit text or in the Tibetan version of the eighth century, it would be of a certain value in showing that at that comparatively early date turquoises were known in India, perhaps also traded from India into Tibet and then played a rôle in the pharmacopœa of both countries. But such evidence could be established only on the ground of an ancient edition preserving the original status of the work. From what has been said above regarding the history of the turquois in India it is not very probable that the passage existed in the Sanskrit original, and if we assume on the basis of the available evidence that the Persian turquois spread in India between the tenth and the fifteenth century, the clause of the Tibetan text relative to Indian turquoises must be regarded as an interpolation, not older perhaps than the sixteenth century. The one feature, however, is conspicuous that the Tibetan terminology of the turquois varieties is not borrowed from India, but created in Tibet; it distinctly refers to the native stones, in opposition to those of India named last, and may well claim a certain age. Altogether six kinds are enumerated, and in the plates illustrating all objects of the *materia medica* described in the text, six kinds of turquois are really pictured.

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[1] Dr. Joseph E. Pogue informs me that the iron-oxide matrix in turquois from a number of localities is reddish.

[2] See HEINRICH LAUFER, Beiträge zur Kenntnis der tibetischen Medicin, p. 12 (Berlin, 1899).

[3] The brief notes given by Mr. WALSH (*Journal Royal Asiatic Society,* 1910, p. 1218) are not yet satisfactory and far from being exhaustive.

[4] In opposition to the four metals, gold, silver, copper and iron, enumerated shortly before this passage, which are designated as "fusible elements."

The plates here referred to are twelve large scrolls or charts preserved in the Great Lama Temple (*Yung ho kung*) of Peking, exact copies of which I had made by an experienced Lama painter; the anatomy and physiology of the human body, and all medicinal substances derived from the three kingdoms are there figured in colors, labeled with their Tibetan names and accompanied by references to the chapters of the Four Tantra where they are described. The turquoises are represented, like the other substances, as being placed in rectangular trays supported by a standard or provided with three feet. The first two kinds, *drug dkar* and *drug dmar*, are painted in a deep-blue color and of oblong shape, no noticeable difference between the two being visible; the edge is marked by a blue line in gold (apparently to express the high quality of the stone) bordered by a line of black ink. It is curious to observe that in each case six stones have been outlined, and it is therefore evident that the draughtsman was guided by a literal interpretation of the two terms *drug dkar* and *drug dmar*, "White Six" and "Red Six." It is hardly plausible that a set of six stones should have been the fixed requirement in ancient times and resulted in this peculiar nomenclature, and I am also inclined to think that the modern Tibetan explanation as given above,— a stone containing one-sixth of white or red tinge,— is a makeshift or an afterthought. It would seem more reasonable to assume that *drug* in this case has no connection with the numeral six, but is an ancient noun signifying this particular variety of turquois. The third variety *sbyad*, also a group of six stones, is painted light-blue; they are pear-shaped, almost globular, surmounted by a curved tip. The two common kinds are each figured as one large stone, the one light-blue, the other grayish-blue, both of curious and fantastic outlines which it is hard to describe. On the second of the two, cloud-patterns in Chinese style of drawing are delineated, probably intended to indicate a "clouded" stone,[1] while the first is decorated with horizontal rows of small black rings presumably expressing veins in the stone. The Indian turquoises, again six in number, are, in distinction from all the preceding ones, light-green in color with fine black veins, and pointed or triangular in shape. It certainly remains an open question as to how far these drawings are faithfully preserved, but despite their imperfection we may learn from them that the appreciation of turquoises by the ancient Tibetans was graduated as follows: Deep-blue, lustrous stones without flaw took the foremost rank;[2] white and red strips or layers were not considered a blemish, but rather a special beauty; the lighter the blue, and the more approaching a gray and green, the more it sank in estimation; stones with black veins and streaks and with cloudy strata were looked upon as common, also those of greenish hues. It is interesting to note that this scale of valuation doubtless going back to ancient times holds good also for the present age.

The small turquoises not larger than a lentil and used for the setting in rings, are designated *pra*.

As famous swords, daggers, saddles and coats-of-mail received in Tibet individual names, so also celebrated turquoises were given special designations. Thus, we read in the History of the Kings of Ladakh that among fifteen turquoises brought from Gu-ge in West Tibet, the best were two, namely, the *Lha gyu od-ldan*, "the resplendent turquois of the gods," and the *Lha gyu dkar-po*, "the white turquois of the gods." [3] Thus, there are also celebrated historical turquoises, as it is recorded in regard to King Du-srong mang-po (beginning of the eighth century) that he found the largest turquois then known in the world, on the top of Mount Tag-tse, a few miles north of Lhasa.[4]

The name of an ancient well-known family of Tibet is *gYu-t'og* (that is, Turquois-Roof). The most celebrated member of it was a physician and author of medical works, who flourished in the eighth century and three times visited India to study medicine at the University of Nālanda. His biography, a very interesting work, is still in existence where it is narrated that he was once visited by gods and demons, who presented him with an immense quantity of turquoises and other precious stones, heaping them on the roof of his house, hence the origin of his name. The mansion of this family still stands in Lhasa near a bridge called "Turquois-Roof Bridge." A Chinese author, writing in 1792, mentions this bridge and records the following tradition: "In the transparent waters of the river are turquois, colored rocks whose bluish tinge seems on the point of dissolving into water; the tops of the stones are bowl-shaped; if once dug away from the mud around them, they would look as big as elephants. One cannot take pebbles out of this river as an amusement as easily as in other streams." [1] It is not known whether this tradition is founded on fact, or whether the tradition connected with Doctor gYu-t'og and his name gave rise to the notion of turquoises existing in the river whose blue tinge may have lent a support to such a view; for in another Chinese source, according to ROCKHILL, it is said: "At the foot of Marpori (the mountain on which the palace of the Dalai Lamas rises) meanders the Kyi-ch'u, whose azure bends encircle the hill with a network green as the dark green bamboo; it is so lovely that it drives all cares away from the beholder."

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[1] A term used also in India (R. GARBE, Die indischen Mineralien, p. 72, note 2) and in our mineralogy (with respect to veins or spots of lighter or darker color than the area surrounding them).

[2] This was the case likewise among the Arabs. The best sort of turquois was considered the one "of a complete purity of color, of a perfect polish, and of a hue entirely uniform" (L. LECLERC, Traité des simples par Ibn El-Beithar [1197–1248], Vol. III, p. 51, *Notices et extraits des manuscrits de la Bibliothèque Nationale*, Vol. XXVI, Paris, 1883). In a similar manner, al-Bērūnī expresses his opinion (WIEDEMANN, *Der Islam*, Vol. II, 1911, p. 352).

[3] *Journal Asiatic Society of Bengal*, Vol. LX, pt. 1, 1891, p. 123.

[4] *Journal Asiatic Society of Bengal*, Vol. L, pt. 1, 1881, p. 223.

In 641 A. D., the powerful Tibetan king Srong-btsan sgam-po married a Chinese princess, the daughter of the Emperor T'ai-tsung of the T'ang dynasty. The story of his wooing of the princess has been made by the Tibetans into a poetical romance in which we find such well-known and world-wide motives of popular tradition as the difficult tasks to be solved by the prospective son-in-law.[2] The candidates for the hand of the princess were many, so the emperor decided that he should obtain her who could best stand a number of tests. One of these was that he laid before the assembled delegates a buckler constructed of a coil of turquois arranged in concentric circles so that one end of it just formed the center; he required that a silk thread should be passed through the apertures of the turquoises from one end of the coil to the other. Nobody could solve the puzzle except the astute Tibetan minister *Gar* who caught a queen-ant and fed it well with milk until it grew bigger. Then he tied a silk thread to its waist, fastening the end of the thread to a silk band which he held in his hand, and placed the ant in the perforation of the first turquois, gently blowing into the hole, till to the amazement of the lookers-on the ant came out at the other end of the coil dragging the thread along.[3]

[1] According to the translation of W. W. ROCKHILL, Tibet from Chinese Sources (*Journal Royal Asiatic Society*, Vol. XXIII, 1891, p. 76).

[2] Compare R. H. LOWIE, The Test-theme in North American Mythology (*Journal of American Folk-lore*, Vol. XXI, 1908, pp. 97–148).

[3] Narrated in the Tibetan Annals of the Kings of Tibet (*rgyal rabs*, manuscript in the writer's possession), Chapter 13, fol. 45a.

The word "turquois" (*gyu*) has become a favorite attribute to designate a sky-blue color; "turquois-lake" (*gyu mts'o*) may be called poetically any blue-glittering lake, but is also the constant epithet of wells and certain favorite lakes, as, for example, for the sacred Manasarovara Lake or the Lake of Yar-brog (Yamdog).[1] Also flowers, the manes of horses, and even bees and tadpoles are described in the same manner; the hair of goddesses and the eyebrows of children born in a supernatural way are called turquois-blue; also the beauty of the body of such beings is compared to the turquois. In Spiti the forget-me-not is called *yu-žung men-tog*, that is, the flower whose essence or main substance is turquois.[2] In ancient mythology "thirteen turquois heavens" are mentioned, and as we speak of the Blue of Heaven, or the sky, the Tibetans say poetically "the turquois of Heaven." In a Tibetan legend, a poetical description of the country is given as follows:[3]

> "At the foot of the giant mountains (the Himālaya) supporting the sky, lakes and flowing streams gather, forming plains of the appearance of turquois, and glittering pyramids of snow-clad crystal rise. This mountain range spreading like a thousand lotus flowers is white and like crystal during the three winter-months; during the three months of the summer it is azure-blue like turquois; during the three months of the autumn it is yellow like gold, and in the moons of the spring, striped like the skin of the tiger. This chain of mountains, excellent in color and form, and of perfect harmony, is inexhaustible in auspicious omens."

This passage is very interesting as revealing the innate nature-love of the Tibetan people and showing the connection of the colors of their favorite gems with the general colors of nature in the course of the seasons.[4] With the majority of the people, turquois is favorite, coral and amber rank next. The blue, green, and blue-green; the red, rose, and pink; the yellow and brown of these three substances are indeed those tinges which most frequently occur among the flora of the Tibetan plateaus. During the summer, large patches of blue, red and yellow flowers abound on the fine pasture lands, and at this sight I could never suppress the thought that the enthusiasm of the Tibetans for turquois, coral and amber must have been suggested and strengthened by these beautiful shades of their flowers which their women as readily use for ornament as stones; indeed, it seems to me, as if owing to its permanency, the stone were only a substitute for the perishable material of the vegetable kingdom.

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[1] Also in the ancient Egyptian texts, the word turquois is used as a designation for the color of water. "Praises shall be offered unto thee in thy boat, thou shalt be hymned in the Āṭet boat, thou shalt behold Rā within his shrine, thou shalt sit together with his disk day by day, thou shalt see the *Ant* fish when it springeth into being in the *waters of turquoises*, and thou shalt see the *Abtu* fish in his hour."—Hymn to the God Rā, in the Book of the Dead, by E. A. WALLIS BUDGE, Vol. I, 1901, p. 78. Interesting studies pertaining to the color of Tibetan lakes and rivers have been made by HERMANN V. SCHLAGINTWEIT, Untersuchungen über die Salzseen im westlichen Tibet, pp. 71 *et seq.* (*Abhandlungen der bayerischen Akademie*, München, 1871).

[2] In this case the word *žung* is to be written *gžung*. A. H. FRANCKE (Ladakhi Songs, p. 13. Reprinted from *Indian Antiquary*, 1902) has proposed to adopt the spelling *žung* in the sense of *chung* "small," so that the name would mean "flower of small turquoises."

[3] Compare I. J. SCHMIDT, Geschichte der Ost-Mongolen, p. 465 (St. Petersburg, 1829). In another passage (p. 439) it is said: "On the plain where diamond rocks glitter is a lake with a mirror like turquois and gold." See also p. 484.

[4] In a Tibetan poem depicting the labors of husbandry (*So-nam bya ts'ul-gyi leu*, published in the Tibetan School Series, No. II, Calcutta, 1890), the awakening of the spring is described, and the first buds on the uppermost branches of the trees are compared with the glimmer of emeralds; the flowers with antlers appear as vomiting sapphires; the great earth is teeming with sap, and resembles the malachite in its medley of blue and green colors.

Turquoises, usually in connection with gold, belong to the most ancient propitiatory offerings to the gods and demons;[1] in the enumeration, gold always precedes turquois as the more valuable gift. They also figure among the presents bestowed on saints and Lamas by kings and wealthy laymen. The thrones on which kings and Lamas take their place are usually described as adorned with gold and turquoises, and they wear cloaks ornamented with these stones. It may be inferred from traditions and epic stories that in ancient times arrowheads were made not only of common flint, but also occasionally of turquois to which a high value was attached. A powerful saint, by touching the bow and arrow of a blacksmith, transforms the bow into gold, and the arrowhead into turquois.[2] The hero Gesar owns thirty arrows with notches of turquois.[3]

In the popular medicine of the present time turquois is, as far as I know, not employed; but it is officially registered as a medicament in several medical standard works derived from or modeled after Sanskrit books. There we meet the typical series of ten substances: gold, silver, copper, iron; turquois, pearl, mother-o'-pearl, conch, coral, lapis lazuli.[4] Turquois is credited, as we saw above, with removing poison, and heat in the liver. It seems almost certain that this notion is taken from Indian lore; we remember the words of Narahari that every poison is rapidly neutralized by it, and that it relieves pain caused by demons. Also in the list of 365 drugs published in Tibetan and Chinese by the Peking apothecary *Wan I*,[1] turquois is listed as a medicament, in the same series as given above.

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[1] LAUFER, Ein Sühngedicht der Bonpo (*Denkschriften der Wiener Akademie*, 1900, No. 7, p. 35); SCHLAGINTWEIT, Die Könige von Tibet, p. 837; A. H. FRANCKE, *Journal Asiatic Society of Bengal*, N. S., Vol. VI, 1910, p. 408.

[2] LAUFER, Roman einer tibetischen Königin, p. 153 (Leipzig, 1911).

[3] I. J. SCHMIDT, Die Taten Bogda Gesser Chan's, p. 283 (St. Petersburg, 1839).

[4] This series occurs also in the Compendium of Tibetan Medicine translated from the Mongol into Russian by A. POZDNEJEV, Vol. I, p. 247 (St. Petersburg, 1908).

A curious utilization of turquois is mentioned in the Biography of Padmasambhava (Ch.. 53) who is said to have availed himself of gold, silver, copper, iron, lapis lazuli, turquois and minium inks for writing on light-blue paper of the palmyra palm and on smoothed birchbark.[2] Whether it is technically possible to use turquois for the coloring of ink I am not prepared to say; perhaps "turquois" is merely a designation for the blue or green color of the ink.

It seems doubtful whether in ancient times the turquois was considered a precious stone by the Tibetans. There is an old enumeration of jewels in the Annals of the Tibetan Kings (*rgyal rabs*, fol. 7) where the two classes, jewels of the gods and jewels of men, are distinguished, each class forming a series of five. The former comprises: 1. *indranīla*, 2. *indragopi*, 3. *mt'on-ka*, 4. *mt'on-ka ch'en-po*, and 5. *skong-mdzes*. The first two are Sanskrit words; No. 1 is the sapphire; No. 2 a kind of ruby; the word under 3 denotes the color of indigo and corresponds to Sanskrit *nīla* which is a general designation of the sapphire; also the next under No. 4 meaning "the great blue one" = Sanskrit *mahānīla*, denotes a superior quality of sapphire;[3] the signification of the stone No. 5 is unknown. The five jewels of men are gold, silver, pearls, lapis lazuli (*mu-men*), and coral. The turquois does not occur in this group, presumably for the reason that it was not classed among precious stones. It has never been, even in times of old, a stone of any exaggerated value. Among the presents made by the ancient kings of Tibet to the emperors of China we find stones like lapis lazuli and rubies (*padmarāga*), but no mention of turquois; likewise, in the lists of tribute sent by the Dalai Lamas to the emperors of China such gifts figure as silk scarfs, bronze images, relics, coral, amber, pearls, incense and woolen stuffs, but turquois does not appear.

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[1] Regarding this work compare BRETSCHNEIDER, Botanicon Sinicum, pt. 1, p. 104 (Shanghai, 1882). There are several editions of this interesting small work, in Chinese and Tibetan style.

[2] LAUFER, Roman, p. 249. Also in the History of the Kings of Ladakh (A. H. FRANCKE's translation in *Journal Asiatic Society of Bengal*, N. S., Vol. VI, 1910, p. 405) writings in gold and turquois are attributed to five wise men in mythical times.

[3] Buddhabhaṭṭa (FINOT, Les lapidaires indiens, p. 41) explains *indranīla* as a sapphire the interior of which has the lustre of the rainbow colors, and which is rare and highly priced, and *mahānīla* as a sapphire with a color so intense that, thrown into milk of a volume a hundred times larger, it colors it like indigo.— "Sapphires of various colors occur in India. Thus, there is the blue or true sapphire of popular language, the color of which may be any shade of blue, from the palest to a deep indigo, the most esteemed tint being that of the blue cornflower. Violet sapphires (oriental amethysts) are also found in the same localities as those in which the true sapphire is met with. The most valuable sapphire found in the East Indies is the yellow sapphire or oriental topaz. A green gem, called by the Europeans in India an emerald, is often seen. It is, however, a green sapphire, and is much harder than the true emerald, which is a green beryl" (G. WATT, A Dictionary of the Economic Products of India, Vol. VI, p. 474).

In the religious service turquoises are employed, strung in the shape of beads, for rosaries, 108 beads being the usual number. The complexion of the god or goddess to be worshipped sometimes determines the selection in the color of the rosary-beads. Thus a turquois rosary is occasionally used in the worship of the popular goddess Tārā of whom there are two principal forms, one of these being conceived as of a bluish-green complexion.[1]

Turquoises are, further, offered on the altars of the gods, and their brass or copper images are adorned with them. Buddhist images, thus treated, may readily be recognized as Lamaist deities, as the Chinese never adopt this method. The number of stones set in an image varies according to its dimensions, and may reach from a half dozen up to a hundred and more. In any case, however, this is not intended as a mere ornamental addition, but the turquoises are to signify the actual jewelry with which the deities are adorned, and which form part of their essential attributes. One of the finest monuments in Tibet is the sarcophagus of the first Pan-ch'en Lama in the monastery of Tashilhunpo near Shigatse. It is of gold, covered with beautiful designs of ornamental work, and studded with turquoises and precious stones. The turquoises, says Captain RAWLING,[2] who has photographed this gorgeous monument, appear to be all picked stones, arranged in patterns, and in such profusion as to cover every available spot, including the polished concrete of the floor. In the oldest temple founded in Tibet about the middle of the eighth century, bSam-yas, which is described at full length in the Annals of the Tibetan Kings, there was a shrine in which the beams are said to have been of turquois; figures of galloping horses of gold were affixed to them, while there were other beams of gold with dragons of turquois attached.[3] This is the earliest Tibetan record regarding carvings from this stone; if the beams of turquois are not merely a metaphor of speech, it may be realized that the turquoises were inlaid in a kind of mosaic.

In the pictorial art of Lamaism jewels take a prominent place. On the first scroll in a set of twelve pictures (in the collections of the Field Museum, Nos. 121,371–382) representing the Eighteen Sthavira or Arhat and the portraits of the Dalai Lamas, we see as the central figure

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[1] Compare L. A. WADDELL, The Buddhism of Tibet, p. 209 (London, 1895).

[2] The Great Plateau, p. 184 (London, 1905).

[3] *T'oung Pao*, 1908, p. 33.

Buddha Çākyamuni holding the alms-bowl of lapis-lazuli color.[1] On the altar in front is depicted a golden bowl containing rubies, lapis lazuli, white conch-shell and turquois. In the foreground is a lotus-pond with three flowers widely unfolded; on the central one three gems of oblong form are figured,— lapis lazuli, turquois, and ruby, emblematic of the well-known prayer formula *Om māṇi padme hūm* ("Oh, the jewel in the lotus!") and of the three precious objects (Sanskrit *triratna*), which are Buddha, his doctrine, and the clergy. In the upper portion of the same painting, two of the Arhat are represented, Aṅgaja and Vakula, the latter holding and stroking an ichneumon which has the ability of spitting jewels; they are gradually dropping into a plate.[2] A tribute-bearer of grotesque racial type is offering to the saint gems in a bowl containing an ivory tusk, a coral-branch, and precious stones of blue, green, rose and pink colors. This is not the only Arhat to whom precious stones are offered, but it is the case also with many others. It is interesting that these tribute-bearers are usually people from Central Asia with unmistakable racial features and appropriate costume, or even turbaned Mohammedans. We find the same figures also on the corresponding Arhat paintings of the Chinese and Japanese, and they are doubtless intended to express the important rôle which Iranians, Turks and Arabs have played in transmitting to the East the precious stones of western Asia.

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[1] The alms-bowl (*pātra*) of the historical Buddha was a plain pot; the miraculous relics of later times which were passed off as Buddha's alms-bowl form an interesting subject for the historical mineralogy of the East. The general history of the bowl or bowls has been traced by H. KERN (Manual of Indian Buddhism, p. 90) and H. YULE (The Book of Ser Marco Polo, Vol. II, pp. 328–330). Here, only the different materials should be pointed out. Fa Hien who started for India in 399 saw the bowl in Peshāwur (Purushapura) and describes it as being "of various colors, black predominating, with the seams that show its fourfold composition distinctly marked" (LEGGE, Record of Buddhistic Kingdoms, p. 35). The latter clause in Legge's rendering does not seem to be quite correct; but however this may be, Fa Hien's account, it seems to me, bears out the fact that the bowl seen by him was carved from onyx in various layers in the style of cameo-work (compare G. WATT, *l. c.*, Vol. II, p. 174). Hüan Tsang (ST. JULIEN, Mémoires sur les contrées occidentales, Vol. I, p. 106; S. BEAL, Buddhist Records of the Western World, Vol. I, p. 99) speaks of the *pātra*, but does not furnish a description of it. Li Shi of the T'ang period (not of the twelfth century, as WYLIE, Notes on Chinese Literature, p. 192, says), in his *Sü po wu chi* (Ch. 10, p. 2; ed. of *Hu-pei tsung wên shu chü*), makes the statement that Buddha's alms-bowl in Peshāwur was of blue (or green) jade (*ts'ing yü*), or in the opinion of others of blue (or green) stone (*ts'ing shi*); then the text of Fa Hien is reproduced. In view of the ultramarine color in which the Buddhist alms-bowls appear on paintings in China and Tibet, it is permissible to think in this case of lapis lazuli; indeed, the word *ts'ing shi*, in this sense, is used in the *Wei lio* (HIRTH, China and the Roman Orient, p. 72). A still earlier reference to Buddha's alms-bowl in the country of the Ta Yüe-chi, already pointed out by F. HIRTH (Chinesische Studien, p. 251) is contained in the commentary to the *Shui king* written by Li Tao-yüan who died in 527 (his biography in *Pei shi*, Ch. 27) where likewise the term *ts'ing shi* is employed, and I concur with Hirth in the opinion that it should be translated in this case by lapis lazuli. In Tibetan portrait-statues of bronze, the alms-bowl is often actually represented and carved from lapis lazuli (A. GRÜNWEDEL, Mythologie des Buddhismus, p. 79), as the outcome of the tradition that the mendicant's platter brought from Nepal to Tibet by the princess K'ri-btsun in the seventh century and working many miracles was made of lapis lazuli (S. CHANDRA DAS, Narrative of a Journey round Lake Yamdo, p. 79, Calcutta, 1887). According to MARCO POLO (YULE's edition, Vol. II, p. 320) the dish of Buddha brought to China for Emperor Kubilai from Ceylon was "of a very beautiful green porphyry," while YULE quotes a Chinese account written in 1350 to the effect that the sacred bowl in front of the image of Buddha in Ceylon was neither made of jade, nor copper, nor iron, but that it was of a purple color, glossy, and when struck sounding like glass.

[2] The same attribute of the jewel-spitting ichneumon (Sanskrit *nakula*) appears in the hands of Kubera, the God of Wealth, guarding the northern side of the world mountain Sumeru.

In the marriage ceremony when the bridal party has arrived at the gate of the bridegroom's house, the officiating priest recites a few benedictory verses, describing the house of the bridegroom: "May there be happiness to all living beings! The lintel of this door is yellow, being made of gold. The door posts are cut out of blocks of turquois. The sill is made of silver. The door frame is made of lapis lazuli. Opening this auspicious door, you find in it the repository of five kinds of precious things. Blessed are they who live in such a house."[1] This is certainly an ideal or poetical description. In a more ancient marital ceremony described in the Tibetan dramatic play *Nang-sa*, "the turquois sparkling in rainbow tints" is tied to the end of an arrow adorned with streamers of five-colored silk which is fastened to the back of the bride to fix the marriage tie.[2] In Ladakh, the bride generally receives, on her wedding day, many of the turquoises which her mother had worn.[3]

To describe all objects in which turquois is employed would mean to survey the whole range of Tibetan ethnography, which is certainly beyond the scope of these notes.[4] But reference should be made to the beautiful Tibetan swords in which the hilts and sheaths worked in repoussé gold or silver are inlaid with large turquois and coral beads. This is an ancient technique practised also by the Turks of Central Asia and the Persians.[5]

So little is known about the localities in Tibet where turquois is found that there have even been authors who doubted its indigenous occurrence.

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[1] S. CHANDRA DAS, Marriage Customs of Tibet, p. 12.

[2] L. A. WADDELL, Buddism of Tibet, p. 557 (London, 1895).

[3] A. H. FRANCKE, Ladakhi Songs, p. 13.

[4] For illustrations see Plates I–V. The Field Museum possesses a rich collection of Tibetan, Nepalese and Chinese jewelry which will give occasion at some future date for a study in decorative and industrial art. The Tibetan process of covering a gold or silver foundation with a mosaic of turquois agrees with the similar technique practised in Siberia during the bronze age, and therefore becomes an historical factor of great importance.

[5] Compare the Sassanian sword reconstructed by J. DE MORGAN (Mission scientifique en Perse, Vol. IV, p. 321, Paris, 1897) the shape of which is strikingly identical with the Tibetan sword.

A. CAMPBELL, in his "Notes on Eastern Tibet,"[1] has the following remarks in regard to turquoises:

> "A great merchant of Tibet named Chongpo, who traded ages ago with India, and once crossed the seas beyond India, brought the finest real turquois to his native country. From that time the stone has been known there, and like coined money, it continues to circulate in the country as a medium of exchange. The imitations brought from China are made of common earthen-colored or other compositions. They are easily detected. Those imported via Cashmere are real stones, but not valuable. The only test of a real stone is to make a fowl swallow it; if real, it will pass through unchanged."

This tradition, if at all correct and not rather founded on a misunderstanding, carries little weight. The word *Chongpo* is not a Tibetan proper name, but simply denotes "a dealer, a trader." There is no evidence of the occurrence of turquoises in India proper; the people of India became acquainted with them from Persia only late in the middle ages through Mohammedan influence, and as shown above, they are first mentioned in Sanskrit literature in the beginning of the fifteenth, possibly also in the thirteenth, century. Thus, there is little or no plausibility in the assumption that India could have given the impetus to the introduction of the turquois into a country where almost every individual is in possession of these stones, and where a general national passion for them is developed among all people high and low, which can have been but cultivated for many centuries and ages. This is corroborated by the facts of language and history, and further by the evidence of localities in Tibet where, in fact, turquois occurs *in situ*.

MARCO POLO,[2] speaking of the province of Caindu, which is identical with the western part of the present Chinese province of Sze-ch'uan, a territory largely inhabited by Tibetan tribes, mentions besides a lake in which are found pearls, also a mountain in that country "wherein they find a kind of stone called turquoise, in great abundance, and it is a very beautiful stone. These also [in the same way as the fishing of the pearls] the Emperor does not allow to be extracted without his special order." Yule remarks that Chinese authorities quoted by Ritter mention mother-o'-pearl as a product of Lithang, and speak of turquoises as found in Djaya (or Draya) to the west of Bathang. This latter notice is quite correct and furnished by several Chinese authors who have visited Tibet and written on the subject.[3] They further mention Ch'amdo, that is, not only the small town in Eastern Tibet so called, but the whole district in which it is situated, and the territory of the capital Lhasa as places for the production of turquois; this locality seems to be particularly rich in this respect, and we have seen that the largest turquois of his time was discovered in the beginning of the eighth century by a Tibetan king on a hill north of Lhasa.

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[1] *The Phoenix*, ed. by J. SUMMERS, Vol. I, p. 143 (London, 1870).

[2] The Book of Ser Marco Polo, ed. by YULE and CORDIER, 3d ed., Vol. II, p. 53 (London, 1903).

[3] W. W. ROCKHILL, Tibet from Chinese Sources (*Journal Royal Asiatic Society*, Vol. XXIII, 1891, p. 272).

I have searched through the Chinese Annals of the Mongol or Yüan Dynasty (*Yüan shi*) for a confirmation of Marco Polo's report regarding the imperial turquois monopoly. Though my efforts have not as yet been crowned with success, I do not give up the hope that such an account will be discovered in the future either in this or in some of the other Chinese works treating of the history of the Mongol period. The turquois, however, is repeatedly alluded to in the *Yüan shi*, as we shall note hereafter.[1]

The first European author to report the indigenous occurrence of turquois in Tibet proper, as far as I know, is the Capuchin Friar Francesco **Orazio della Penna di Billi** in his "Breve Notizia del Regno del Thibet" written in 1730.[2]

According to **Sarat Chandra Das**,[3] the finest turquoises are obtained from a mine of the Gangs-chan mountains of Ngari-Khorsum

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[1] For the rest, there can be no doubt of the correctness of Marco Polo's statement. The turquois monopoly was the outcome and a part of all other exclusive prerogatives of the emperor extending to all precious metals and stones (compare in particular **Marco Polo**, Vol. I, p. 424). This monopoly of the Mongols forms a counterpart to the turquois monopoly of the Persian Shāhs related by J. B. **Tavernier** (ed. V. **Ball**, Vol. II, p. 104): "For many years the king of Persia has prohibited mining in the 'old rock' for any one but himself, because having no gold workers in the country besides those who work in thread, who are ignorant of the art of enamelling on gold, and without knowledge of design and engraving, he uses for the decoration of swords, daggers, and other work, these turquoises of the old rock instead of enamel, which are cut and arranged in patterns like flowers and other figures which the jewelers make. This catches the eye and passes as a laborious work, but it is wanting in design." According to the opinion of the Persian General C. **Houtum Schindler** who about 1880 was for some time governor of the mining district and acting manager of the mines, operations were probably carried on by the Persian Government up to 1725 (M. **Bauer**, Precious Stones, p. 394). On Schindler's work see p. 42.

[2] First edited by J. **Klaproth** in the *Nouveau Journal asiatique*, 1835 (the passage referred to on p. 32 of the separate issue: "pietre turchine"). English translation in C. R. **Markham**, Narratives of the Mission of George Bogle to Tibet etc., p. 317, (London, 1876). I may be allowed to point out that the word "cobalt" in the English version, preceding the turquois stones, is based on a mistranslation of Orazio's *azurro* (present spelling *azzurro*) which is lapis lazuli. Indeed, this Italian word is traced to the Persian and Arabic names of lapis lazuli, *lazvard* and *lāzuward*. We know that this mineral is found in several localities of eastern Tibet (Lho-rong Dzong and Kung-pu Chiang-ta) and in the district of Lhasa (**Rockhill**, *Journal Royal Asiatic Society*, Vol. XXIII, 1891, pp. 272–4, and **Timkowski**, Reise nach China durch die Mongolei, Vol. II, pp. 188, 189, Leipzig, 1826), but it may be doubted that cobalt occurs in Tibet (though it may be found in Sikkim, as stated by J. C. **White**, Sikhim and Bhutan, p. 322, London, 1909).

[3] Tibetan-English Dictionary, p. 1152.

(West Tibet).[1] This is also corroborated by the historical fact that the kings of Ladakh received a tribute of turquoises from Guge.[2]

From my own experience I may say that according to information received in Tibet turquois occurs in several mountains of the great State of Derge in eastern Tibet, though my Tibetan informants were unable to state the exact localities (or, which is more probable, did not want to state them). At any rate, the fact cannot be called into doubt, for in Derge, celebrated for the high development of art-industries and its clever craftsmen, also fine carvings of turquois are turned out, of which several specimens were secured by me that exhibit a peculiar, very pleasing, soft apple-green tinge differing from any other kind met in Tibet and China,. and seemingly coming nearer to the Mexican variety. It seems also that in the mountains to the north of Ta-tsien-lu in western Sze-ch'uan a turquois of inferior quality and a sickly green is obtained; it is, however, so poor and insignificant that the Chinese traders there accustomed to the brilliant blue of their home product look down upon it as spurious. A great many of these greenish stones are utilized in a large collection of Tibetan silver jewelry brought together by me in that town. I was first inclined to accept the opinion of the Chinese consulted by me, and to regard these stones as imitations, but DR. JOSEPH E. POGUE to whom I sent three specimens for examination convinced me that this opinion was unfounded. He writes as follows:

> "The three specimens give the following specific gravities (theoretical for turquois is 2.6 — 2.83):
>
> 1. Small dark-green specimen 2.71
> 2. Small light-green specimen 2.81
> 3. Larger perforated green specimen 2.68
>
> All three specimens are phosphates, giving good tests. Washed with strong ammonia, they did not lose their color, as most artificially colored turquoises will do when so treated. The specimens reacted characteristically when heated; and when viewed under the microscope, one contains a little granular quartz attached to its edge."

Captain C. G. RAWLING[3] gives the following summary as the result of his inquiry about the occurrence of turquois in Tibet:

> "The rough stones are bought at the fairs held in the country and conveyed by the Indian merchants to Amritsar and Delhi, where they are mounted in gold and silver, and afterwards reimported. Practically every matrix originally comes from Tibet, but though inquiries were made at all the more important places, no information could be obtained as to the situation of the mines. The Phari people obtain their

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[1] That is, the three districts of Ngari comprising the territories of Rutok, Guge, and Purang. *Gangs-chan* means the glacier-mountains.

[2] SCHLAGINTWEIT, Die Könige von Tibet, p. 862.

[3] The Great Plateau, p. 294 (London, 1905).

supply from Calcutta, Shigatse from Lhasa, whilst at many other places the people merely said that they did not know where the stones came from, that they had had theirs for years, and that none were to be found in their district or anywhere near. Despite these unsatisfactory answers, the consensus of opinion leads one to believe that they exist in the greatest numbers in the country situated between Lhasa and the western border of China."

I am somewhat doubtful in regard to Rawling's point that Tibetan turquoises are worked up in India and find their way back into Tibet. I am rather under the impression that the reverse is the case, as already stated by GEORGE C. M. BIRDWOOD[1] that a good deal of Tibetan jewelry is imported into India through Bhutan, Sikkim, Nepal, and Cashmir, chiefly in silver — ornamented with large, crude turquoises, and sometimes with coral — in the shape of armlets, and necklaces, consisting of amulet boxes, strung on twisted red cloth, or a silver chain, and in various other forms, such as bracelets, anklets, etc., hammered, cut, and filigrained.

I have carefully gone over four volumes of the Trade Statistics of the Government of Bengal.[2] Turquois is not specified in these columns; it cannot, therefore, claim a big share in the trade between Bengal and Tibet. There is, however, a general item: Jewelry, and Precious Stones and Pearls. Jewelry was imported into Bengal from Tibet in 1906–7 at the value of 56 Rupees, precious stones and pearls, unset, at the value of 2,923 Rupees. The export of the latter from Bengal into Tibet for the same year amounted to 27,329 Rupees, in the preceding year, 1905–6, to 32,112 Rupees, in 1904–5, to only 12,460 Rupees (probably owing to Younghusband's expedition). I do not know how large a share is due to turquois in these figures.[3]

OSVALDO ROERO[4] gives a list of merchandise imported into Ladakh from the official register kept by the customs of Leh, the capital of Ladakh. Among the products there enumerated he enlists turquoises as coming from Persia by way of Bokhāra, the best and most valuable coming from Seistān. The same view that turquoises are imported into Ladakh from Persia through Bokhāra had previously been upheld by ALEXANDER CUNNINGHAM.[5] H. RAMSAY[6] enumerates three classes of good turquoises which are free from flaws and with very little green, while inferior kinds are known as "Tibetan" and "Chinese turquoises," which come to Ladakh from Lhasa or China; they are full of flaws and generally very green. The latter remark holds good only for Tibetan stones, as the Chinese are usually azure-blue. "The best turquoises," concludes RAMSAY, "come up from India. Ladakhis object to flaws, but they like a little green, as they consider it a sort of guarantee that the turquois has not been manufactured."

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[1] The Industrial Arts of India, Vol. II, p. 28.

[2] The Trade of Bengal with Nepal, Tibet, Sikkim, and Bhutan. Last volume published, Calcutta, 1907.

[3] There is a pretty lively trade in turquoises on the part of Tibetans in Darjeeling; the stones sold there come from Tibet and China (via Tibet). In most cases it is possible to discriminate between turquoises of Tibetan and Chinese origin.

[4] Ricordi dei viaggi al Cashemir, Piccolo e Medio Tibet e Turkestan, Vol. III, p. 72 (Torino, 1881).

[5] Ladak, p. 242 (London, 1854). Also in Gilgit the turquois is employed (J. BIDDULPH, Tribes of the Hindoo Kush, p. 74, Calcutta, 1880).

[6] Western Tibet: A Practical Dictionary, p. 162 (Lahore, 1890).

In the following notes on China it will be seen that large quantities of turquoises cut into stones or beads and worked into carved objects are imported nowadays from China into Tibet; they are largely used by Chinese traders for purposes of barter with the Tibetans.

III. TURQUOIS IN CHINA

The turquois, though found at present in central China *in situ* and commercially exploited by Chinese traders for export trade into Tibet and Mongolia, is not generally known to the Chinese people, for the apparent reason that it is but little employed by them and plays no significant part in their life.[1] Outside of Peking and Si-ngan fu, where the trade is monopolized by a few of the initiated, the stone is hardly familiar to the people at large, nor to the educated classes; in Shanghai, Hankow, and Canton, it is entirely unknown. This is glaringly evidenced by the fact that the Chinese commission engaged in working up the "English and Chinese Standard Dictionary," published by the Shanghai Commercial Press, in 1908, is not even acquainted with their own Chinese name for the stone, and speaks of it as a substance entirely foreign to their country; their definition of turquois (Vol. II, p. 2442) is "a Persian gem of a greenish-blue color, etc., first known to Europe through Turkey," and the same translated literally into Chinese, without giving the proper Chinese term for the stone. Traders who have come in contact with Tibetans or Mongols or even settled among these peoples are certainly acquainted with it, and may even be induced to wear a turquois button, but a "barbarous" odor is always attached to it, and it seldom enters the ornaments of a self-respecting Chinese woman.

Besides the HON. W. W. ROCKHILL, S. WELLS WILLIAMS [2] seems to be the only author to mention turquoises as known to the Chinese. It is somewhat hard to understand how other careful observers could have overlooked its presence. F. v. Richthofen,[1] who gives a fairly complete summary of the commerce of Si-ngan fu does not mention it, nor does he notice it in his enumeration of goods traded from China to Tibet (p. 133). As far as I am aware, no handbook on mineralogy or precious stones makes any reference to the Chinese turquois; it is not noted either by F. de Mély in his otherwise very complete work "Les lapidaires chinois."

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[1] It follows therefrom that the knowledge of the turquois in China cannot be very old, and this conclusion will be confirmed by our historical inquiry.

[2] The Middle Kingdom, Vol. I, p. 310 (New York, 1901).

The present Chinese name for turquois is *lü sung shi*, that is, "green fir-tree stone," or *sung êrh shi* [2] (also *sung-tse shi*) that is, fir-cone stone. This name must not be confounded with the designation *sung shi*, "fir-tree stone," which is not a stone, but by which petrified pieces of the fir-tree are understood; these are also called *sung hua shi*, "fir-tree transmutation stones," but their very color description as being yellow or purple shows sufficiently that they are entirely distinct from turquois. It will, however, be useful to consider briefly what Chinese authors have to say in regard to these petrefacts, because from these statements we shall gain a clue to the understanding of their name for turquois.

The earliest trustworthy mention of such petrefacts of vegetal origin is made in the "Annals of the T‘ang Dynasty" (618–906 A. D.; *T‘ang shu*, Ch. 217 B, p. 5) compiled from the records of the dynasty by Ngou-yang Siu (1007–1072) and Sung K‘i (998–1061) [3] and completed in 1060. This notice embodied in the chapter on the Uigur (*Hui-hu*) relates to Central Asia, more particularly to the region inhabited by the tribe Bayirku (*Pa-ye-ku*),[4] and runs as follows:

> "The country is grassy and produces noble horses and fine iron. There is a river called K‘ang-kan. The people cut up fir-trees and throw the pieces into the water. In the course of three years these alter into blue-colored stone, in which the marks of

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[1] Letters, p. 108.

[2] In the Cantonese dialect *luk ts‘ung shek* and *ts‘ung i shek*, respectively. The words with this meaning will be found in the Chinese-English Dictionaries of Eitel and Giles, and in the Chinese-Russian Dictionary of Palladius; Couvreur and others do not give them. The translation by turquois is confirmed by the Great Imperial Dictionary in Four Languages, which has the series: Chinese *lü sung shi*, corresponding to Manchu *uyu*, Tibetan *gyu*, and Mongol *ugyu*, all of which refer to the turquois. In a description of Tibet (*Wei ts‘ang t‘u chi* by Lu Hua-chu, published in 1785) occurs also the expression *sung jui* (No. 5723) *shi*, "stone of fir-tree buds." The German-Chinese Dictionary published by the Catholic Missionaries of South-Shantung (p. 916, Yen-chou fu, 1906) gives for turquois the word *lü sê shi*, "green-colored stone." G. Schlegel (Nederlandsch-chineesch woordenboek, Vol. IV, p. 232, Leiden, 1890), besides the common *sung êrh shi*, registers for "turkoois" the word *ts‘ing yü*, that is, blue or green jade. This must be an artificial modern formation, or rather an error, as the Chinese have never ranged turquois among jade but solely among ordinary stone, on which more will be said farther on.

[3] Giles, Biographical Dictionary, pp. 606, 698.

[4] Chavannes, Documents sur les Tou-kiue (Turcs) occidentaux, p. 88 (St. Petersburg, 1903).

the wood are still preserved in delicate outlines. It is generally called K'ang-kan stone."[1]

In 767 A. D. the painter Pi Hung is said to have executed a wall-painting on which fossil fir-trees were depicted, evoking poetical eulogies on the part of admirers.[2]

The Taoists, with their interest in the beauties and wonders of nature, could not fail to seize this attractive subject, and to interpret the phenomenon. The *Lu i ki* (*Ko chi king yüan*, Ch. 7, p. 6), a fabulous book by the Taoist monk Tu Kuang-t'ing of the tenth century,[3] reports:

> "In a pavilion on a mountain in Yung-k'ang hien in Wu chou (the modern Kin-hua fu in Chê-kiang Province) there are rotten fir-trees. If you break a piece off, you will find that it is not decayed in the water but a substance altered into stone which previously was not yet transformed in that manner. On examining the pieces in the water, they turn out to be transformations of the same character. These metamorphoses do not differ from fir-trees as to branches and bark; only they are very hard."[4]

[1] Compare D'HERBELOT, Bibliothèque orientale, Vol. IV, p. 165 (La Haye, 1779). The Chinese cyclopædias quote this passage very inaccurately and with arbitrary changes. *Ko chi king yüan* (Ch. 7, p. 6), for example, writes the name of the river K'ang-tse, omits a whole sentence and adds at the end: "The stone has the designs of a fir-tree."

[2] *P'ei wên yün fu*, Ch. 100 A, p. 21 b.

[3] Compare WYLIE (Notes on Chinese Literature, p. 200) who dates this author in the tenth century (likewise p. 221). The *Lu i ki* has been adopted into the Taoist Canon (L. WIEGER, Le canon taoiste, p. 111, No. 586); Dr. WIEGER, however, places the work and the author in the ninth century. M. PAUL PELLIOT (*Journal asiatique*, 1912, *Juillet-Août*, p. 149) fortunately sheds light on the matter by informing us that Tu Kuang-t'ing lived toward the close of the T'ang dynasty, and that all his works come down from the beginning of the tenth century. BRETSCHNEIDER (*Botanicon Sinicum*, pt. I, p. 172, No. 492) states that a work with the title *Lu i ki* must have been extant in the sixth century, as it is quoted in a book of that time; but it seems not to be known whether the work there referred to is really identical with the *Lu i ki* of Tu Kuang-t'ing. When WYLIE points out that the productions of this author have forfeited all claim to authenticity, this is certainly correct as regards their historical value. He must not be judged, however, in this light, but should be appreciated as a Taoist recluse and dreamer who reveals to us interesting phases of Taoist psychology by describing visions of dragons, tigers, tortoises, serpents and fishes, or relates extraordinary dreams and strange phenomena happening near the graveyards, who now records the principal hills and lakes of the empire famous as retreats of Taoist devotees, now tells the story of the Wu-i Mountain of Fu-kien renowned for its plantations of tea.

[4] The *Po wu chi*, a work by Chang Hua (232–300 A. D.) says: "The root of the fir-tree partakes of the nature of stone; stones, when cracked, are dissolved into sand and produce a fir-tree; and a fir-tree, when reaching three thousand years, again alters into stone." The *Po wu chi* was lost during the Sung period and compiled at a later date from extracts embodied in other publications (WYLIE, Notes, p. 192); there is, consequently, no guaranty that any text of this work, as preserved in the present editions, really goes back to the third century.—The above subject has also an interesting bearing on the Chinese knowledge of fossils, which should be treated some day in a coherent essay. There is a great deal of information on dragon bones and teeth originating from fossil hipparion and rhinoceros, petrified fishes, crabs, and swallows, all procurable in the Chinese drug-stores. There are similar accounts among the Arabs (M. REINAUD, Relation des voyages faits par les Arabes, Vol. I, p. 21; P. A. VAN DER LITH, Livre des merveilles de l'Inde, p. 171), and the palæontologi-

In regard to these petrefacts of Yung-k'ang, another interesting note is given by Tu Wan or Tu Ki-yang in his Treatise on Stones, entitled *Yün lin shi p'u* (Ch. B, p. 3) published in the year 1133 (Sung period), the oldest Chinese *lapidarium* extant.[1] This author speaks of a poet of the T'ang dynasty, Lu Kuei-mêng,[2] who had obtained a pillow and a lute of stone, and left two poems on these objects. In the introduction to the poems, he mentions the fir-trees of Yung-k'ang which from old age had turned into stones, and that one evening, as the effect of a big rainstorm, a whole fir-tree grove on the mountains suddenly changed into stone, and fell to the ground, smashed into pieces from two to three feet in diameter, and these are still there; the natives of the place, then, carried such pieces away and worked them up into footstools, some as small as a fist, or into low tables by breaking the larger pieces.

Another author, Chang Lu-i, states that "there are two varieties of these stones produced by transformation of fir-trees, one of yellow, and one of purple color, of very fine substance and shape, with water marks on the surface, some also with marks of the tree bark, others with marks of the tree knots, such as occur on the T'ien-t'ai mountains (in T'ai-chou fu, Chê-kiang). There are those the transmutation of which is not complete, but which still bear the fir-tree substance; these are useful as medicine. If those perfectly transformed are taken as medicine, they have the effect upon man that he forgets passion and stops longing; this medicine cures love-sickness; if men or women who are unhappily in love partake of it, they will intercept their thoughts and not remember again." This is certainly a sympathetic remedy; in the same manner as the tree has lost its life and changed into a lifeless mass of stone, so it has the effect on the human heart to make it forget, and to render it cold and old like stone.

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cal knowledge of the ancients has been treated by E. v. LASAULX, Die Geologie der Griechen und Römer, pp. 6–16 (*Abhandlungen der bayerischen Akademie*, München, 1851).

[1] It is reprinted in the enormous collection *Chi pu tsu tsai ts'ung shu*, Section 28; also in *T'ang Sung ts'ung shu*. This work is widely different from the class of books styled *pên ts'ao*, in which the therapeutic value of the substances occurring in nature forms the principal point of view. The book of Tu Wan is written from the standpoint of economic geography. The minerals are all named for the localities from which they originate, and the author is chiefly interested in their industrial utilization. This feature lends his notes a practical value, and a complete translation of them, aside from the purely scientific interest, might yield also results for the study of economic mineralogy in China.

[2] He is known as the author of the *Siao ming lu* (WYLIE, Notes on Chinese Literature, p. 182) and of a small treatise on the plough (*ibid.*, p. 93, and O. FRANKE, Kêng Tschi T'u, p. 45, Hamburg, 1913). BRETSCHNEIDER (*l. c.*, p. 172, No. 493) mentions a work Poems of Lu Kuei-mêng as cited in *T'ang shu*, Ch. 196. The Collection of his Poems (*shi tsi*) is quoted in *Kao chai man lu* (Ch. 1, p. 1; *Shou shan ko ts'ung shu*, Vol. 91).

Also the *Pên ts'ao kang mu* (Section on Stones, Ch. 9, p. 14) of Li Shi-chên, the Chinese standard work on materia medica and natural history completed in 1578 after 26 years' labor,[1] mentions the 'fir-tree stone' (*sung shi*) after Su Sung, an author of the Sung period, as being produced in Ch'u-chou fu (Chê-kiang Province) and being like the trunk of a fir-tree but solid stone. According to the opinion of some, it is fir-tree which has changed into stone after a long time; it is gathered a great deal on the mountains, and is made into pillows.[2]

It seems to me that similar notions have been active in inducing the Chinese to confer on the turquois the name "green fir-tree stone," because they looked upon it as a transformation from the fir-tree. This may be inferred as a plausible explanation, for as far as I know, there are no definitions of the name in Chinese literature; the word *lü sung shi* can be traced only to the eighteenth century (see p. 60).

A modern author, Chung Kia-fu, in his collected works (*Ch'un ts'ao t'ang ts'ung shu*, 1845, Ch. 29, p. 19) has developed a peculiar view on the origin of turquois which he places in the same category as amber:

> "When the moss growing on rock after many years consolidates and assumes color, turquoises arise, those of a deep hue being called *lü sung*, those light in color *sung êrh* ('fir-tree ears'). This is the same process as takes place with respect to fir-tree resin which after many years consolidates and develops into amber, that of a deep shade being called *hu-p'o*, that light in color being called bees'-wax (*mi-la*).[3]

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[1] The literary history of this interesting work, first printed in 1596, has been traced by BRETSCHNEIDER, Botanicon Sinicum, pt. 1, p. 55. Despite many efforts I have not succeeded in procuring the original edition which seems to be entirely lost and not now to exist in any Chinese library. Bretschneider states that the earliest edition extant seems to be that of 1658; but a print of 1645 in 16 vols., edited by Ni Tun-yü of Hang-chou, was secured by me in Tōkyō, now in the John Crerar Library of Chicago, which, besides, has an edition of 1826 in 39 volumes, and one issued in 1885 in 40 volumes, the best print in existence. An excellent photo-lithographic reprint was published in 1908 by the firm *Tsi ch'êng t'u shu* of Shanghai after an edition of 1657 by Chang Ch'ao-lin. The text in the Shun-chi editions is more accurate than in the K'ien-lung and Tao-kuang editions. Prof. HIRTH (*Journal China Branch Royal As. Soc.*, Vol. XXI, 1886, p. 324) mentions a Ming edition printed in 1603, possibly the second edition published.

[2] A. WYLIE (in his treatise Asbestos in China: Chinese Researches III, p. 152, Shanghai, 1897) quotes from the *T'u king:* "Among the hills at Ch'u chou (in Chê-kiang Province) a species of pine stone is produced, resembling the trunk of the pine, but in reality a stone; some say that the pine in the course of time becomes changed into stone. Many people take it to decorate their mountain lodges, and also shape it into pillows." This passage is evidently taken from the *Pên ts'ao kang mu*, the abbreviated title *T'u king* being identical with the *T'u king pên ts'ao* of Su Sung. Compare also F. DE MÉLY (Les lapidaires chinois, p. 86, Paris, 1896) where the translation "pour représenter des tranches d'arbres" should read "to represent pillows." On p. 208 DE MÉLY cites an interesting note from DE ROSNY, according to which a fossil pine-tree was found in Japan in 1806.

[3] *Mi-la* is the designation for a light-yellow kind of amber in which presumably also copal and artificial productions occur. The Imperial Geography of the Manchu Dynasty (*Ta Ts'ing i t'ung chi*, Ch. 274) ascribes its production to Shi-nan fu in Hu-pei Province, but in another passage connects its introduction with the Hollanders. Other Chinese authors derive the origin of *mi-la* from Yün-nan Province

I once received a water-receptacle to wash writing-brushes in, made from turquois, of the size of a dish, in the shape of lotus-leaves, and onion-green and kingfisher-blue in color."

In the Annals of the T'ang Dynasty (*T'ang shu*), there is a curious word *sê-sê* (No. 9599) occurring in several passages and assumed by HIRTH and CHAVANNES to have the meaning of *turquois*. The one is met with in Ch. 221 B, p. 2 b, in an account of Sogdiana, but relating to the region of Ferghana, where it is said:

> "North-east from the capital (modern Tashkend), there are the Western Turks, north-west P'o-la; 200 *li* south one comes to Khojend, 500 *li* south-west to K'ang (that is, Sogdiana, the region of Şamarkand). In the south-west is the river Yao-sha (the Yaxartes), and in the south-east are big mountains producing *sê-sê* (or *sö-sö*)."[1]

Another passage containing this word will be found in Ch. 256 of the *T'ang shu*, in the account of Tibet.

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and Tibet (the Tibetan name is *ko-shel;* in Mongol: *tabarkhai shel;* in Manchu: *meisile*, an artificial hybrid from Chinese *mi* and Tibetan *shel* 'crystal'). In Ch'êng-tu fu, the capital of Sze-ch'uan Province, a number of small girdle-pendants carved from this substance were obtained by me (Yün-nan being given as the place of production) which have not yet been examined as to their composition.

[1] See F. HIRTH, Nachworte zur Inschrift des Tonjukuk, p. 81 (in W. RADLOFF, Die alttürkischen Inschriften der Mongolei, Vol. II, St. Petersburg, 1899). E. CHAVANNES, Documents sur les Tou-Kiue (Turcs) occidentaux, p. 140 (St. Petersburg, 1903) translating the same passage accepts the rendering of Hirth. Also GILES, in the second edition of his Chinese-English Dictionary, sides with this translation. PALLADIUS, who transcribes the word *she-she*, was not of this opinion, for in his excellent Chinese-Russian Dictionary (Vol. II, p. 569) he gives the definition "azure-colored, transparent precious stone." He has likewise another word *she-she* (written with the character No. 9600 in the Dictionary of Giles) with the meaning of "emerald." COUVREUR (Dictionnaire classique de la langue chinoise, p. 584) explains *sê-sê:* "nom d'une belle pierre et d'une espèce de verre." In his Dictionnaire chinois-français (p. 13), the same author gives the interpretation: "pierre bleue et transparente," and for the plain *sê:* "limpidité d'une pierre précieuse; pur, net." It would be very interesting to have the Chinese source pointed out to which the statements of Palladius and Couvreur in regard to the transparency of the stone go back; in the Chinese records at my disposal I regret I can find nothing to this effect. In view of the mineralogical properties of turquois it is evident that this is a point of importance, for non-transparency is one of the prominent characteristics of turquois. As we can but presume that both Palladius and Couvreur must have founded their definition on some Chinese document, this would present another of the objections which must be raised to the weak hypothesis of identifying *sê-sê* with the turquois. E. H. PARKER (*China Review*, Vol. XVIII, 1890, p. 221) defines *sê-sê* as a sort of jade much used for arrowheads and other purposes by the Tibetans, Tungusians, and even Ta Yüe-chi (Indoscythians) who after their conversion to Buddhism had a sacred *pātra* or alms-bowl made of the same material (*ts'ing shi*); in his opinion, *sê-sê* is identical with the latter term, which means green or blue (but possibly also dark-colored) stone. This point of view is hardly correct. The arrowheads of the Tungusian tribes, as corroborated by archæological finds made in the Amur region, were of nothing but common flint. The *ts'ing shi* of which the alms-bowl of the Indoscythians was made in all probability was lapis lazuli and would accordingly mean in this case 'blue stone'; on Buddhist pictures alms-bowls are usually painted an ultramarine or lapis-lazuli blue color (see above p. 14). There are several other instances where the word *ts'ing shi* has the same meaning (HIRTH, China and the Roman Orient, p. 72, and Chinesische Studien, p. 250). There is no Chinese text saying that *sê-sê* was a kind of jade, that it was a *ts'ing shi*, or ever used for arrowheads.

"The officers in full costume wear as ornaments — those of the highest rank *sê-sê*, the next gold, then gilded silver, then silver, and the lowest copper — which hang in large and small strings from the shoulder, and distinguish the rank of the wearer."[1]

Bushell comments that *sê-sê* is a kind of precious stone found in the high mountains north-east of Tashkend. At the outset, it does not seem very likely that in the latter passage the word has the significance of turquois, for it outranks gold (compare above p. 11) and however much appreciated in Tibet, a turquois could never outshine gold nor have any value equivalent to it, as was and is the case everywhere else; and as shown above, it was not even looked upon as a precious stone by the ancient Tibetans. There was still less reason for the Tibetans to import their turquoises from Tashkend — if *sê-sê* should denote especially the turquoises of that locality — as they found them in great abundance in their own country. Nor was the turquois apt to serve for the distinction of the first official rank in Tibet; as it has always been there part and parcel of the adornment of all classes of people and particularly the ornament of women who are loaded with it. The *sê-sê* of the Tibetan officials must, therefore, have been something else, a much scarcer and more valuable gem. An idea of its value is afforded by a notice in the Annals of the Five Dynasties (*Sin Wu tai shi*, Ch. 74, p. 4 b) where it is said that the women of the T'u-po (Tibetans) wear beads of *sê-sê* in the plaited tresses of their hair, and that, as regards the best quality of these beads, a single one is bartered for, or has the exchange value of, a noble horse.[2] This seems to me to be sufficient evidence militant against the identification of *sê-sê* with the turquois, as far as Tibet is concerned, for a single turquois, whose value in Tibet may range from a few cents up to a dollar or so, could never have had nor has a valuation equivalent to a good horse.[3]

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[1] See S. W. Bushell, The Early History of Tibet, p. 8 (*Journal Royal Asiatic Society*, 1880). The *T'ang shu* (K'ien-lung edition, Ch. 216 a, p. 1 b) has instead of *sê-sê* the reading *k'in-sê*, a frequent compound meaning "lute and harp" (Giles's Dictionary, No. 2109). It is evident that this way of writing is erroneous, and was perhaps suggested to a copyist who did not understand the unusual word *sê-sê*. The passage is not contained in the Old History of the T'ang dynasty (*Kiu T'ang shu*), but only in the New History (*Sin T'ang shu*).

[2] This passage occurs in the report of the embassy of Kao Kiü-hui of 938 a. d. Abel-Rémusat (Histoire de la ville de Khotan, p. 77, Paris, 1820), who has translated this account, rendered the word *sê-sê* by "pearls."

[3] In the History of the Kingdom of Nan-chao (*Nan-chao ye shi*, published in 1550), a tribute of *sê-sê* is mentioned for the year 794 as being sent from Nan-chao, comprising the territory of the present province of Yün-nan, to the court of China (C. Sainson, Histoire particulière du Nan-Tchao, p. 54, Paris, 1904). At first sight, the *sê-sê* in this instance might be regarded as turquoises. R. Pumpelly, as will be noted below, has referred to Yün-nan as a locality producing a mineral similar to turquois, though this report requires confirmation. There is further evidence in the Annals of the Yüan Dynasty (*Yüan shi*, Ch. 16, p. 10 b) that in 1290 turquoises (*pi tien-tse*)

In the Old History of the T'ang Dynasty (*Kiu T'ang shu*, Ch. 198, p. 11 b), a description of the country Fu-lin (Syria) is given, whose great wealth in precious stones is emphasized. In the palaces, it is said there, the pillars are made of *sê-sê*.[1] It is difficult to see, if *sê-sê* should have to be identified with the turquois, how pillars could be made of this material. The Chinese text does not say that the pillars were adorned or inlaid with this stone but produced from it.

A fourth passage in the *T'ang shu* (Ch. 221 A, p. 10 b) referring to *sê-sê* is contained in an account of Khotan (*Yü t'ien*). Emperor Tê-tsung (780–805) despatched an emissary, Chu Ju-yü by name, to Khotan on the search for jade, and he obtained there a hundred pounds (catties) of *sê-sê*.[2] This notice is of great interest in showing that the precious stones of this name were really imported into China, and that the mart for them was Khotan.

There are, however, still earlier references to the jewel *sê-sê*. It is for the first time mentioned in the *Pei shi* (Ch. 97, pp. 7 b, 12 a) and in the "Annals of the Sui Dynasty"[3] (*Sui shu*, Ch. 83, containing a record of the foreign countries then known to the Chinese). Both histories

were gathered in the circuit of Hui-ch'uan in Yün-nan Province; my friend Prof. Paul Pelliot was good enough to draw my attention to this passage. Another passage alludes to a gift of a thousand turquoises sent from Hui-ch'uan in 1284 (*Kin-t'ing se wên hien t'ung k'ao*, Ch. 23, p. 7). But it seems likely from what will be stated farther on in regard to the first acquaintance of the Chinese with the turquois in the Mongol period that the turquois mines of Yün-nan were opened only shortly before this time. At any rate I am not inclined to transfer this account without reserve to the date 794, nor to believe in the identity of the different terms *sê-sê* and *pi tien-tse*. While I should merely admit the possibility of such an identification, another historical explanation of the case may be pointed out. In the eighth century, the T'ai or Shan, the stock of peoples forming the kingdom of Nan-chao, were in close political alliance with the Tibetans who had then reached the zenith of their power. It would therefore be justifiable to conclude that the *sê-sê* of Nan-chao were derived from Tibet and are to be identified with the ancient Tibetan *sê-sê*, which, as will be shown hereafter, may be the emerald. In the *T'ang shu* (Ch. 222 A, p. 2 a), the women of the Southern *Man*, the large stock of aboriginal tribes formerly spread over the whole of southern China, are said to fasten in their hair beads, shells, *sê-sê*, and amber. In this case it is rather tempting at first sight to interpret *sê-sê* as turquois, because this combination of turquois and amber, as pointed out before, occurs indeed among the Tibetan group of tribes. But the *Man* do not belong to the Tibetan family, and another difficulty is presented by the fact that there are no records either of ancient or modern times pointing to the employment of the turquois among any tribe of the *Man*, so that it is safer to assume that the turquois is not understood in the above text.

[1] HIRTH, China and the Roman Orient, p. 53. At that time (1885) Hirth had not advanced any identification of this term.

[2] He embezzled the jade objects destined for the emperor, was sentenced, and died in exile (CHAVANNES, Documents, p. 128, note 2).

[3] The *Pei shi*, "Northern Annals," was written by Li Yen-shou (GILES, Biographical Dictionary, p. 474) and completed about the year 644; it comprises the history of the dynasties of the north ruling from 386 to 618. The Sui dynasty ruled from 589 to 618. The *Sui shu* was composed by Wei Chêng (581–643; GILES, *l. c.*, p. 856) under the T'ang dynasty and completed in 636.

mention the jewel in two passages,— first, as a product of the country of Sogdiana (*K'ang*) corresponding to the region of Samarkand, and secondly as a product of Persia (*Po-se*, from *Pārs*).[1] The text of the *Pei shi*, with the same indications, is found also in the "Annals of the Wei Dynasty" (*Wei shu*, Ch. 102, pp. 5a and 9b).[2] But this passage has no independent value, because Ch. 102 of this work treating of the countries of the west, as well demonstrated by CHAVANNES,[1] has been merely reproduced from Ch. 97 of the *Pei shi* by a committee of scholars of the Sung period headed by Fan Tsu-yü (1041–1098).

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[1] It is noticeable that *sê-sê* as products of Persia are mentioned in *Pei shi* and *Sui shu*, but not in the two *T'ang shu*. The *Kiu T'ang shu* (Ch. 198, p. 11) enumerates as precious objects of Persia coral-trees, *ch'ê-k'ü*, agate, and "fire-pearls" (*huo chu*). The *T'ang shu* mentions only coral as a product of Persia and the gift to China of a couch of agate (Chavannes, Documents, pp. 171, 174). The exact history of the term *ch'ê-k'ü* which in general denotes a large white conch (Tibetan *dung*, Sanskrit *çankha*, Arabic *shenek:* M. Reinaud, Relation des voyages faits par les Arabes, Vol. I, p. 6), and sometimes seems to refer to a precious stone remains to be ascertained (compare Hirth and Rockhill, Chau Ju-kua, p. 231; Pelliot, *T'oung Pao*, 1912, p. 481). The "fire-pearls" were lenses of rock-crystal, alleged to have been used for producing fire (F. de Mély, Les lapidaires chinois, p. 60; Chavannes, Documents, p. 166; Pelliot, *Bulletin de l'Ecole française d'Extrême-Orient*, Vol. III, 1903, p. 270; *Pên ts'ao kang mu*, Ch. 8, p. 18 a). In the *Sui shu*, *sê-sê* are enumerated together with genuine pearls, glass, amber, coral, lapis lazuli, agate, rock-crystal, *huo ts'i*, and diamond. The name *huo ts'i* (the alleged identity with *huo chu* remains to be proved) has not yet been properly identified. In the *Nan shi* (Ch. 78, p. 7) these stones are mentioned as products of central India and described as having the appearance of *yün-mu* and the color of violet gold (Pelliot, *l. c.*); the difficulty is that also the word *yün-mu* which according to Pelliot seems to designate mica and mother-o'-pearl is not yet determined beyond doubt. Possibly, *huo-ts'i* designates the garnet. The word *sê-sê* is, in the text of the *Sui shu*, followed by the words *hu lo kie lü t'êng*. At first I was inclined to take the verb *hu* in its literal sense "called, designated," and to believe that the words following it represent a gloss, being the Persian or Arabic name of the stone in Chinese transcription. Reconstructing the ancient sounds of those Chinese characters we would arrive at the reading *lok* (or *rok*)*-ket-li-dang;* but there is no word in Persian or Arabic to be identified with such a form. M. Paul Pelliot, to whom I submitted this difficult point, has been good enough to write me that this passage had already attracted his attention, and that he does not regard the incriminated words as a gloss; he thinks that the word *hu* is also part of the transcription, and that two further products are enumerated in their Persian names. The passage, accordingly, should be understood in the sense that Persia produces *sê-sê*, *hu-lo*(*k*), and *ket-li-dang*. The two latter names, however, are as yet unidentified, but with M. Pelliot's very plausible point of view, a better attempt at identification might be pursued. Indeed, Prof. A. V. Williams Jackson had called my attention to the fact that *katlidang* may be a compound of the word *qatlān*, "link" or "scale," used alike in Arabic, Turkish and Persian, and the Persian word *tan* "body," the content of the term implying scale or chain armor. This is very suggestive, as indeed Persia was the country which supplied China with chain-mail (ancient specimens in the Field Museum). The *T'ang shu*, in the account on Samarkand (*K'ang*) states that in the beginning of the period *K'ai-yüan* (713–741) Samarkand sent as tribute to China chain-mail (*so-tse k'ai*). This question will be shortly discussed by me in another place. *Liang shu* (Ch. 54, p. 14 b) attributes to Persia coral-trees one to two feet high, amber, agate, genuine pearls, and *mei-hui*. Hirth and Rockhill (Chau Ju-kua, p. 16, St. Petersburg, 1912), treating the products of Persia after *Wei shu* and *Sui shu*, entirely omit the *sê-sê* (and several others). It seems doubtful if, as stated so positively by the two authors, "most of these products came, of course, from India, or from countries of south-eastern Asia, only a few being products of Arabia, or countries bordering on the Persian Gulf" (and again on p. 7). This is true only to a certain extent; the *sê-sê*, at any rate, are not mentioned by the Chinese as products of India or south-eastern Asia, but exclusively as products of Persia and Sogdiana, to which, later in the T'ang period, Fu-lin, Tashkend, Tibet, and the *Man* are joined.

[2] The Wei dynasty ruled from 386 to 556; the *Wei shu* was written by Wei Shou (506–572; Giles, *l. c.*, p. 867) and presented to the throne in 554.

It is thus evident that *sê-sê* were known to the Chinese prior to the age of the T'ang dynasty as occurring in the territory of Persia and Sogdiana, to wit, within the Iranian culture-area. It is noteworthy also that any particular region or mountain producing the stone is not alluded to in these earlier texts as subsequently in the *T'ang shu*, and that *Pei shi* and *Sui shu*, while locating *sê-sê* in Sogdiana, do not allude to it in their notices of Tashkend (*Shi kuo*).

As I did not know on what evidence Prof. HIRTH had based his identification of *sê-sê* with the turquois, I consulted him regarding this point, and he was good enough to furnish the following note which is here reproduced with his kind permission.

"The word *sö-sö* (in Cantonese *shat-shat*, *sit-sit*, or *sok-sok*) has, besides others, the meaning of a precious stone, 'a greenish or bluish bead' (*pi chu*), as quoted in *P'ei wên yün fu*, Ch. 93 B, p. 85. The *Pên ts'ao kang mu* (Ch. 8, p. 55) says that the people of the T'ang dynasty called green (or blue) precious stones by the name *sö-sö*. The Japanese sources as quoted in GEERTS, Les Produits de la nature japonaise et chinoise, p. 481, do not apparently refer to *sö-sö*, but the *T'u shu tsi ch'êng* (section 27, National Economy, Ch. 335) contains an extract from the *T'ien kung k'ai wu* in which *sö-sö* is classed with greenish precious stones. The *T'ang kuo shih p'u* (*ibid.*) relates the story of a big *sö-sö* which the author thinks was not a genuine one; the same story is told in *Yen fan lu*, Ch. 15, p. 11.

"BRETSCHNEIDER (*Chinese Recorder*, Vol. VI, p. 6) was, as far as I know, the first to find out that *sê-sê* was not a musical instrument as Pauthier had assumed, but a precious stone.[2] In his translation of a passage regarding precious stones found in the *Chö keng lu* (reproduced in his Mediæval Researches, Vol. I, pp. 173–6), he refers to 'stones called *tien-tze*' which occur in Nishapur and Kirman. Bretschneider says of these: 'I have little doubt that the Chinese author understood by it the turquoise, the Persian name of which is *firuzé*. Both Nishapur and Kirman produced turquoise. So did the hills of Ferghana referred to in *Nachworte*, etc., p. 81, for the territory of Ferghana furnished turquoises, according to VON KREMER, Kulturgeschichte des Orients, Vol. I, p. 329. These are the reasons which had induced me to render *sö-sö* by 'Türkis'."[3]

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[1] Documents, p. 99.

[2] The word *sê-sê* in the sense of a jewel, as will be seen below, is the Chinese transcription of a foreign word. The single word *sê* denotes a stringed musical instrument, a kind of lute, described *e. g.* by J. A. VAN AALST (Chinese Music, p. 62, Shanghai, 1884). But there is a passage (in the *San kuo chi*, *Wei chi*, commentary to the Biography of Ch'ên Se-wang, quoted in *P'ei wên yün fu*, Ch. 93 B, p. 85) where also the compound *sê-sê* seems to have the meaning of a musical instrument. In the *Tsin shu* (Ch. 97, p. 2) it is said in regard to the Shen Han, a Korean tribe, that they are skilled in playing the *sê-sê* which in shape is like a five-stringed lute (*chu*, No. 2575).

[3] It should be added that it is Bretschneider himself (Mediæval Researches, Vol. I, p. 140) who first proposed the translation of *sê-sê* as turquois, but with the restriction of a "probably."

It seems to me that the color designation insisted on by Hirth is hardly conclusive; the color name *pi*, 'bluish-green' (originally a kind of jade) is quite indistinct, and aside from the fact that there are many other green or blue stones like emerald, lapis lazuli, malachite, sapphire, etc.,[1] this attribute with reference to *sê-sê* does not appear in contemporaneous records of the Sui or T'ang periods, but only in later authors who were not personally familiar with the stone. It was known in China under that name only to a limited extent, during that time, and to the later generations the newly coined word simply became a poetical name with no other meaning than that of a rare, precious stone. The one fact stands out clearly, that *sê-sê* was looked upon as a precious stone, a fact for which more testimony will be given, and this is evidence that it can hardly be the turquois. It is always essential to ascertain to what category an object in the views of the Chinese belongs; these categories are always fixed and stable, and suggest an inference as to the nature of the object in question. No Chinese has ever considered turquois a precious stone, but just a common stone good enough for barbarous ornaments.[2] It is worth 5 Taels (about $3.50) a catty (1⅓ pounds) in Si-ngan fu where it is sold by weight, and if the famous *sê-sê* were nothing more than that, the Chinese authors would not have expressed any enthusiasm about them.[3] Hirth's quotation from Bretschneider is hardly in favor of his view that *sê-sê* was the turquois; BRETSCHNEIDER's statement merely shows that at the end of the Mongol dynasty — the *Cho keng lu* was published in 1366 — the Persian turquois became known to the Chinese.

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[1] That the definition *pi chu* means little is illustrated by the fact that other jewels are also defined by this term, as, for example, the pearl called *mu-nan* (HIRTH, China and the Roman Orient, p. 59) which is even described as yellow in other texts (*Ko chi king yüan*, Ch. 32, p. 7 b). Compare also *P'ei wên yün fu*, Ch. 7 A, p. 101 b (*pi chu*). The color argument should therefore be disregarded.—The comparative tables of the colors given by W. TASSIN (Descriptive Catalogue of the Collections of Gems in the U. S. National Museum, *Report of National Museum*, 1900, pp. 541, 542) enumerate the green stones as follows: zircon, sapphire, garnet (demantoid and ouvarovite), chrysoberyl (alexandrite), spinel, topaz, diamond, olivine (peridot), tourmaline, beryl (emerald and aquamarine), quartz (chrysoprase, plasma, prase, and jasper), turquois. The blue stones are: sapphire, spinel, topaz, diamond, tourmaline (indicolite), beryl (aquamarine), iolite (water sapphire, dichrolite). It should not be overlooked either that, as shown by the modern word *lü sung shi*, the color of turquois is described by the Chinese with the word *lü*, not *pi*.

[2] A. J. C. GEERTS (Les produits de la nature japonaise et chinoise, p. 202, Yokohama, 1878) was cautious enough to pay due attention to the distinction made between *pierres ordinaires* and *pierres précieuses* in the *Pên ts'ao kang mu*.

[3] In the *Lapidarium* of Pseudo-Aristotle (JULIUS RUSKA, Das Steinbuch des Aristoteles, p. 152, Heidelberg, 1912) it is said in regard to the turquois: "Its color delights those afflicted with sorrow, but it is not employed for the costume of the kings, because it detracts from their majesty." A similar remark is made by Ibn al-Baiṭār: "It is soft and a bit fragile, and is not used for the ornaments of the sovereigns" (L. LECLERC, Traité des simples, *l. c.*, p. 50). In an Arabic work of 1175 it is said: "Many kings hardly have the desire to wear a turquois, because the vulgar frequently utilizes it as sigillum and wears finger rings which are imitations of its best kind" (WIEDEMANN, Beiträge zur Geschichte der Naturwissenschaften, XXX. Zur Mineralogie im Islam, p. 234, Erlangen, 1912). Also in Europe turquoises were low in price. "Admodum magno pretio non venditur, quia magna illarum ex Oriente affertur copia," says A. BOETIUS DE BOOT (Gemmarum et lapidum historia, p. 271, ed. of A. TOLL, Lugduni Batavorum, 1636). The general rule may be set down that there is a large consensus of opinion as to the value of precious metals and

From three practical examples it may be demonstrated that *sê-sê*, as known during the Sung period, cannot be construed to mean turquois.

In the *K'ao ku t'u* (Ch. 10, p. 22 b), a book on ancient bronzes by Lü Ta-lin, completed in 1092, a girdle-clasp is figured and described as being made of *sê-sê*; it is a highly ornamented piece, engraved in fine lines and ending in a curve shaped into a dragon's head. This whole technique would be impossible if the material were turquois, which results only in straight, stiff, angular lines (compare Plates VI–VIII).

The *Ku yü t'u p'u*, "Illustrated Description of Ancient Jades," compiled in 1176 and printed in 1779, describes several jade specimens adorned with the stone *sê-sê*,— a sword possessed by the Sung Emperor T'ai-tsu (968–976), having a hilt ornamented with amber, *sê-sê*, and genuine pearls (Ch. 28, p. 10). The Chinese would hardly display such bad taste as to unite a cheap stone like turquois with genuine pearls. In Ch. 97, p. 10, of the same work a jade lantern of the Sung palace is figured and described, the eight sides of which are adorned with coral, amber, *sê-sê* and such like jewels (*pao*). In this case turquois is again out of the question, as it is not considered by the Chinese a precious stone or a jewel, but just an ordinary stone.[1]

The two works here quoted come down from the Sung period, and it can be shown from another source of the same epoch that the word *sê-sê* designated at that time a stone capable of carving found on the very soil of China, and that, consequently, the *sê-sê* in the age of the Sung dynasty are affairs different from those mentioned in the *Pei shi*, *Sui shu* and *T'ang shu* for Persia, Sogdiana, Ferghana, and Tibet. Kao Se-sun, a poet and essayist who lived in the latter part of the twelfth century,[2] is the author of an interesting work on miscellaneous

minerals among peoples of all times, and that the changes which have affected the appreciation of precious stones from the days of antiquity until now are but very slight, chiefly due to the operations of fashion and variations in the sources of supply. Thus it is not very likely that a stone looked upon as non-precious at present by general agreement of opinion was ever prized as a jewel in earlier periods of history.

[1] Such carvings of *sê-sê* are referred to also by other authors of the Sung period. Chou Mi in his interesting work *Yün yen kuo yen lu* (Ch. B, p. 31 b), a review of ancient bronzes, paintings and jades which had come to the notice of the author during his lifetime, mentions the carving of "a crane moaning in the autumn" entirely made from this material. This very subject savors of the impressionism of the Sung artists, and in this case turquois is inconceivable, not only for technical but also, and even more so, for artistic reasons. The work quoted is embodied in the collection *Shi wan küan lou* edited by Lu Sin-yüan and thoroughly analyzed by PAUL PELLIOT (*Bulletin de l'Ecole française d'Extrême-Orient*, Vol. IX, 1909, p. 246).

[2] GILES, Biographical Dictionary, p. 368; WYLIE, Notes on Chinese Literature, p. 161.

subjects, entitled *Wei-lio.*[1] In Ch. 5, p. 3, he has gathered several notes concerning *sê-sê.* He quotes the *Huan yü ki*[2] to the effect that *sê-sê* are mined in Shan-chou[3] and P'ing-lu.[4] Neither of these localities is known as having ever produced turquois. We shall see farther on that turquois became known and was mined in China only under the Yüan dynasty following the Sung, so that we may justly conclude that the Chinese of the Sung period were not yet acquainted with it. Besides, there is the technical evidence that turquois, according to its natural properties, could not have entered such objects as are reported to have been made of *sê-sê.* The *Wei lio* furnishes us with additional evidence on this point, which goes to show that, if these reports are trustworthy, a substance *sê-sê* of Chinese production was utilized as early as the T'ang period. It is related in regard to an official of that time, who presided over the bureau of the salt and iron monopoly in the province of Fu-kien, that he owned a pillow made of *sê-sê* placed on a golden bedstead.[5] Emperor Hien-tsung (806–820) tried to estimate its value, but arrived at the conclusion that it was a priceless treasure, while others said that this pillow was made from a beautiful stone, but not from *sê-sê.* The author of the *Wei lio* adds: "What is circulating among our contemporaries under the name *sê-sê,* I believe is made from molten stone."[6] So it seems that at the Sung period the *sê-sê* may have been, at least partially, artificial productions. It is self-evident that the pillow referred to cannot have been made of turquois. The rectangular shapes of Chinese pillows with convex surface are well known, and it is impossible to carve turquois which is quarried in long slabs[7] into such a form.

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[1] Reprinted in *Shou shan ko ts'ung shu,* Vol. 74.

[2] A general, mainly geographical, description of China published by Yo Shi during the period *T'ai-p'ing hing-kuo* (976–981) of the Sung dynasty.

[3] In the province of Ho-nan (PLAYFAIR, Cities and Towns of China, No. 6157).

[4] District in Shan-si Province (PLAYFAIR, No. 5812).

[5] The *Wei lio* quotes this story from the *Yen fan lu* of Ch'êng Ta-ch'ang, written in 1175. The *P'ei wên yün fu* (*l. c.*) gives it after the biography of Lu Kien-tz'e in the *T'ang shu,* so that there is no doubt that it relates to the period of the T'ang dynasty.

[6] There are different versions of this story handed down, the details of which are not of interest in this connection. According to the *T'ang kuo shi p'u,* containing records from 723 to 821 by Li Chao of the T'ang period (as quoted in the *T'u shu tsi ch'êng*), the said official was discharged on account of defraudations; the pillow which was half the size of a peck was confiscated after a judicial trial and sent up to Emperor Hien-tsung who called some shop-keepers as experts to determine its value. Their opinions were divided, the one calling it a priceless treasure, the others a beautiful stone, but not a genuine *sê-sê.*

[7] Several such specimens showing turquois in the matrix, obtained in Si-ngan fu, are in the Field Museum.

The *Wei lio*, further, refers to two stories taken from the *Ming-huang tsa lu.*[1]

Emperor Ming-huang is said to have erected in the palace Hua-ts'ing a bathing establishment consisting of ten rooms where he had a boat built of silver and steel, varnished, and adorned with pearls and jade; moreover, he piled up *sê-sê* in the bathing pool. The author of the *Wei lio* thinks that the use of the word *lei* (No. 6833) "to pile up" in this connection indicates that the *sê-sê* in question were beads, and not stones. But this supposition is hardly correct, for it leaves entirely unexplained what these beads (or pearls) had to do in the bath. In the actual text of the *Ming-huang tsa lu*[2] the story, however, is related in the form that the *sê-sê* were utilized to build up the well-known Three Isles of the Blessed of mythological fame, and this account sounds more plausible. In this case, *sê-sê* seems to have been a kind of building stone.[3] The other story in the *Ming-huang tsa lu* relates to Dame Kuo-kuo, a sister of the celebrated beauty and imperial concubine Yang Kuei-fei,[4] who built a house and rewarded the workmen with two gold cups and three pecks of *sê-sê;* one peck of these, according to the opinion expressed by the author of the *Wei lio*, had the value of a pearl. He further tells after the *Wu lei siang kan chi*, a work of the poet Su Shi (1036–1101), that Emperor I-tsung (860–873) of the T'ang dynasty presented a princess with a screen of *sê-sê* adorned with genuine pearls strung on blue and green silk, whence our author Kao Se-sun infers that in this case *sê-sê* was a kind of pearls of brilliant quality. This discourse leads us to think that the Sung writers did not know any longer what the *sê-sê* of the T'ang dynasty were, that the *sê-sê* peculiar to that age were entirely lost in the Sung period, that substitutes were then in vogue, merely designated by that name and ascribed to two localities, Shan-chou and P'ing-lu, and that even the belief prevailed that the *sê-sê* passed off under this name at that time were artificial productions due to some smelting process.[5]

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[1] That is, Miscellaneous Records regarding Emperor Ming-huang (712–754), a work by Chêng Ch'u-hui of the T'ang period.

[2] Printed in the collection *Shou shan ko ts'ung shu*, Vol. 84, Ch. B, p. 4.

[3] This seems to be the case also in a poem of Po Kü-i (772–846) when he speaks of "a piece (or slab) of *sê-sê* stone" (*i p'ien sê-sê shi; P'ei wên yün fu*, Ch. 100 A, p. 47). Neither the addition "stone" nor the word *p'ien* would be used here, if the domestic *sê-sê* had been a precious stone or gem.

[4] GILES, Biographical Dictionary, p. 908.

[5] Under the Yüan dynasty the *sê-sê* are mentioned by Ch'ang Tê, a Chinese envoy who visited Bagdad in 1259, as precious stones in the palace of the Caliph, together with pearls, lapis lazuli and diamonds (BRETSCHNEIDER, *Chinese Recorder*, Vol. V, p. 5). Bretschneider does not make in this passage an attempt at identifying the stone. When he says that, according to K'ang-hi's Dictionary, it is a kind of pearl, it should be remembered that the Chinese word *chu* means only a bead, regard-

If as early as the Sung period the Chinese had lost all correct notions of the *sê-sê* of the Leu-ch‘ao and T‘ang periods, there is no reason to wonder that the confusion becomes complete among the later authors who are simply content to repeat the older statements. Characteristic of this state of affairs is the explanation given in the *T‘ung ya*, a miscellany written by Fang Mi-chi at the close of the Ming period: "The *sê-sê* are looked upon by some as precious stones, while the *Wei lio* considers them as pearls. Ch‘êng T‘ai-chi says: The *sê-sê* circulating at our time are all made from burnt stone. There are, however, three kinds of *sê-sê*:— precious stones like pearls are the genuine ones; those passing into blue and changing their color are the burnt ones, which are round and bright; Chinese beads of colored glass and baked clay are also called *sê-sê* by a mere transfer of the name." [1] There is assuredly not one Chinese author to venture the identification of *sê-sê* with turquois; neither under the Yüan nor under the Manchu dynasty when turquois was perfectly known in China did anybody assert that it was identical with the *sê-sê* in vogue during the T‘ang dynasty.[2]

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less of the material, whereas a pearl is always ***chên chu***, a true or genuine pearl. In his Mediæval Researches (Vol. I, p. 140), he says, however, that *sê-sê* is ***probably*** the turquois. In the Annals of the Yüan Dynasty (*Yüan shi*, Ch. 21, p. 7 b, reign of Emperor Ch‘êng-tsung, 1295–1307) there is another reference to *sê-sê*, two thousand five hundred catties of which are reported to have been palmed off on officials in lieu of money; but this transaction was soon stopped by the emperor. The turquois cannot be understood in this case, because, as will be seen below, this stone was known in the Mongol period under the name ***pi tien*** and is always so designated in the ***Yüan shi***. Another text allows the inference that what was known as *sê-sê* in the Yüan epoch was a stone coming from Manchuria. The *Chêng tse t‘ung* written in the beginning of the seventeenth century is quoted in K‘ang-hi's Dictionary as saying that at the time of Emperor Jên-tsung (1312–20) of the Yüan dynasty it was reported that the subprefecture Kin-chou (in Fêng-t‘ien fu, Shêng-king, Manchuria) offered *sê-sê* which had been gathered in a cave. The passage occurs in the ***Yüan shi***, Ch. 24, p. 2 b; the Emperor was requested to send an envoy to the place who should gather the stones, but declined, as he regarded them as useless. Consequently the *sê-sê* of the Mongol period, as far as they relate to Chinese territory, cannot have been turquoises, as it was the very turquois which was highly appreciated by the Mongol rulers.

[1] Also Fang I-chi who lived in the first part of the seventeenth century, in his work ***Wu li siao shi*** (Ch. 8, p. 23 b; edition of Ning tsing t‘ang, 1884) states that colored glass beads are designated *sê-sê*. This is the most recent author in whom I have been able to trace this word.

[2] BRETSCHNEIDER (Mediæval Researches, Vol. I, p. 175) is entirely erroneous in his assertion that it is stated in the *Pên ts‘ao kang mu* that the stone called *tien-tse* was known under the name of *sê-sê* at the time of the T‘ang dynasty. The *Pên ts‘ao* does not contain a word to this effect. Its author, Li Shi-chên, states in the beginning of his essay on precious stones that blue ones are called *tien-tse* (No. 11,199); this is not the word *tien-tse* (No. 11,180) used in the *Cho keng lu* and *Yüan shi* (see below). Then follow ten sentences which have nothing at all to do with this subject, whereupon he proceeds to say, as stated above, that blue-green ones were called *sê-sê* by the T‘ang people. It is therefore evident that these two statements separated from each other by several lines are not mutually connected, and that, on the contrary, in the mind of Li Shi-chên *tien-tse* and *sê-sê* are entirely distinct affairs; neither in the case of *tien-tse* does he refer to *sê-sê*, nor in the case of *sê-sê* to *tien-tse*; and he says nowhere that the one is identical with the other. Even did he say so, his

Li Shi-chên, the author of the great work on natural history, *Pên ts'ao kang mu*, makes one brief allusion to it (Section on Mineralogy, *kin shi*, Ch. 8, p. 17 b) in the chapter on Precious Stones (*pao shi*). Enumerating the different kinds of jewels mentioned in earlier texts, he says: "As regards the blue-green (*pi*) ones, the people of the T'ang dynasty called them *sê-sê*; as regards the red ones, the Sung people called them *mo-ho*; nowadays the general term is simply precious stones which are used for inlaying head-ornaments and utensils." This passage shows that Li Shi-chên considers the *sê-sê* as a gem peculiar to the T'ang period, and that he regards it as a precious stone, not as an ordinary stone.[1] The lack of any description on his part bears out the fact that he did not know the stone from personal acquaintance, and that he merely speaks of it on the ground of meagre traditions.

It is thus manifest that at various periods and with reference to different localities the Chinese have linked different ideas with the word *sê-sê*, that the later accounts are of no value in its determination as regards the earlier periods of the Leu-ch'ao and T'ang, and that even for the T'ang epoch a clear distinction must be made between the *sê-sê* of the countries outside of China and those within the Chinese dominion.

The various texts of the *Pei shi*, *Sui shu* and *T'ang shu* relating to foreign countries go to prove that the *sê-sê* of those times were valuable jewels, and that for this reason the word can hardly denote the turquois. It is not known to me on what authority von Kremer's statement of turquois mines in Ferghana rests (his book is unfortunately not accessible to me), but I should think that he could not be regarded as an

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assertion would be valueless, as he simply reproduces literary reminiscences, but does not show any actual knowledge of the stones of which he is speaking. We might well make bold to say that Li Shi-chên (as most of his countrymen during the Ming period) had never seen a turquois. In the official Statutes of the Ming Dynasty (*Ta Ming hui tien*) jade, agate, coral, amber, pearls, and ivory are frequently mentioned in connection with state paraphernalia and court costume, but turquois is conspicuous by its absence.

[1] Also in the great cyclopædia *T'u shu tsi ch'êng*, *sê-sê* are classified among precious stones (*pao shi*), likewise in the *T'ien kung k'ai wu*, a work on technology by Sung Ying-sing, of 1637 (Ch. 18, p. 58 b). Prof. Hirth, in his above note, alludes to this book after an extract in the *T'u shu tsi ch'êng*. As an edition of this very scarce and valuable work printed 1771 in Japan is in my possession (despite diligent search I could not find any in China), I may say that it contains nothing to elucidate the subject; it simply says that of green stones there are *sê-sê* beads, emeralds (*tsie-mu-lü*), rubies (*ya-ku*) and the various kinds of *k'ung ts'ing* (on the latter see F. de Mély, Les lapidaires chinois, p. 112, Paris, 1896). The author, accordingly, repeats bookish reminiscences but had no actual knowledge of, or experience with these stones which are to him mere names. It is certainly essential to determine in investigations of this kind, whether a Chinese author speaks of an object from direct knowledge of it, or merely reproduces the statements of his predecessors. In other words, we must adopt sound and critical philological methods before venturing any conclusions. It is manifest that the statements of the Ming and Ts'ing authors concerning *sê-sê* are of a purely bookish character and weak echoes of the past, but have no value whatever for the study of the question as to what the *sê-sê* of the past really were.

authority on mineralogical matters; presumably he refers to the Arabic authors alluded to by Max Bauer (see below). I do not doubt that, as stated by Hirth, turquois is found in modern times in the region of Ferghana, although the evidence which I am able to find is rather slight.[1] On the other hand it is asserted by Bauer also that turquois occurs *in situ* in the region of Samarkand.[2] Bauer does not state his source, and I have no means of tracing it; the "unknown time" when the turquois mines were operated there is a rather unsatisfactory feature, and it would certainly remain to be proved that turquois was quarried in that region as early as the T'ang period (618–906). But granting the benefit of the doubt to those arguing on the opposite side, the possibility should be admitted that in the one passage of the *T'ang shu* indicated by Hirth and Chavannes the word *sê-sê* could denote the turquois, if the mineralogical condition of the present time, provided the fact is correct, will be admitted as evidence.[1] It cannot, however, be admitted as already demonstrated, that in other early passages the turquois is disguised under the word *sê-sê*; there is no forcible argument in favor of such a guess (supposition it can hardly be called); on the contrary, the valuation and utilization of the stone speak strongly against it.

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[1] The opinion that turquois occurs in Ferghana is largely based on a remark of H. Lansdell (Russian Central Asia, p. 515, London, 1885) who says that turquois is found at Mount Karumagar, 24 miles N. E. of Khojend; but Lansdell was an amateur traveler of journalistic tendencies in whose observations little confidence can be placed. The Armenian *lapidarium* translated into Russian by K. P. Patkanov (Precious Stones, their Names and Properties according to the Notions of the Armenians, p. 48, St. Petersburg, 1873) mentions Khojend as a source for turquois. On the other hand it should not be passed over with silence that one of the best explorers of Ferghana who has given a detailed description of the region, Ch. E. de Ujfalvy (Le Kohistan, le Ferghanah et Kouldja, p. 51, Paris, 1878) remarks on its mineral resources as follows: "In the mountains of Ferghana are found iron, lead, charcoal, quartz, kali, amethyst crystals, rock-crystal, silver, mica schist, sulphur, etc. (a cave near Aravān has stalactites and stalagmites). In the district of Andidjān there are rich sources of naptha of excellent quality, and also sulphurous sources at 38° Celsius." He does not mention turquois. Turquoises are still utilized by the Sart in and around Tashkend for the decoration of silver necklaces, bridles, girdle-clasps, etc. (see, for example, H. Moser, A travers l'Asie centrale, pp. 104–7, Paris, 1885). My colleague Dr. Karutz at the Museum of Lübeck, who has traveled extensively in Russian Turkistan, writes me that he encountered two areas in which turquois is diffused, among the Tatars of Russia and among the Sart of Turkistan, but that he did not find it among the Turkmen and the Kirghiz; he therefore concludes that it occurs only in the town population, but not among the nomads of the steppe; he learned nothing about indigenous sources of the stone, but is convinced that it is imported from Afghanistan. There is, he says, a rumor to the effect that turquois is found in the Kirghiz steppe, but he doubts the fact, as it is not employed by the Kirghiz in their ornaments.

[2] Max Bauer (Precious Stones, p. 396) has the following note on turquois in this region: "It is stated that there are turquois mines, yielding mostly green stones, further to the north-west, beyond the Persian frontier between Herat and western Turkistan. According to the statements of ancient [?] Arabic writers, the precious stone was found at Khojend, from whence came also the green *callais* (*callaina*) of Pliny, now considered to be identical with turquois [this is extremely doubtful: note of the writer. On p. 392 Bauer says: "Whether the ancients were acquainted with turquois is doubtful."]. Other localities in the same region have also been recorded; for example, in 1887 in the mountain range Kara-Tube, fifty kilometres from Samarkand. The turquois occurs here in limonite and quartzose slate, and the place was, at some unknown time, the scene of mining operations. Finds of turquois have been made in the same region in our own time; for example, in the Syr Darya country in the Kuraminsk district (in the Kara Mazar mountains), and also in the Karkaralinsk district in the Kirghiz Steppes (Semipalatinsk territory of Siberia). These and other occurrences in the same region have no commercial importance and need no further consideration."

Another moot question is the historical position of the turquois in those regions which are covered by the word *sê-sê*; there is no great antiquity and, accordingly, no archæology of the turquois in western Asia. It does not appear in Assyria, Babylonia or ancient Persia; it hardly plays any rôle in Greek and Roman antiquity.[2] Egypt[3] is the only country in the Old World which may lay claim to a great antiquity in the utilization of the turquois mined in the Sinai Mountains, and some objects inlaid with turquois mosaic and assigned to the Siberian bronze period, though neither their locality nor their time is exactly ascertained, may be of considerable age (see p. 58). So far as I know, no really ancient carved object of turquois has as yet come to light in Persia or Turkistan,[1] while a great variety of gems appears in the Persian intaglios, particularly in those of the Sassanian epoch (226–642 A. D.) among which turquois is strikingly absent.[2] It is no less because of this lack of archæological evidence that I hesitate to believe in the proposed identification of *sê-sê* with turquois, as regards the older accounts of the *Pei shi* and *Sui shu*.

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[1] Personally I am not convinced. It will be seen below that the first actual knowledge of the turquois dawns upon the Chinese as late as the Mongol period when a newly coined word for it appears, and when the word *sê-sê* continues with quite a different meaning. It is inconceivable to me that the knowledge of an object, when it is once acquired (and particularly of an object so striking to the eye as a turquois), can ever become lost. The tradition of the Mongol period is entirely cut off from that of the T'ang, the two not being interrelated. If the *sê-sê* of Ferghana were the turquois, why are the *sê-sê* objects occurring in China in the T'ang period not so described that a plain conclusion as to this material can be drawn? But they were evidently made of some building-stone. For this reason the question may be justly raised whether the account of the *T'ang shu* in regard to the mountain near Tashkend where *sê-sê* is produced really possesses great importance; it is somewhat vague, the name of the mountain not even being given; the report is evidently reproduced from hearsay. The earlier accounts of the *Pei shi* and *Sui shu*, which ascribe these jewels to an adjacent region without making reference to a definite locality, seem to me to be more to the point. All that can be safely laid down therefore is that *sê-sê* occurred in the territory of Ferghana and Sogdiana during the time from the fifth to the seventh century. In view of the other texts quoted above which must be equally taken into account in a consideration of this question, there is no reason to place all emphasis on this one statement; *sê-sê* occurred in Persia and Syria, and were traded in Khotan. Thus, they held the territory of western Asia and the dominion of the Western Turks. And as will be seen farther on, they were brought over to China by Manicheans or Nestorians.

[2] H. BLÜMNER, Technologie und Terminologie der Gewerbe und Künste bei Griechen und Römern, Vol. III, p. 248 (Leipzig, 1884). It is still more doubtful to me than to Blümner if the *callaina* or *callais* of Pliny, as has been supposed, refers to the turquois; the evidence favoring this theory is extremely weak; Pliny's statement that the stone is produced in Farther India or beyond India and in the Caucasus (nascitur post aversa Indiæ, apud incolas Caucasi) where we positively know that no turquois is found proves that he does not speak of the turquois. Compare p. 2, note 2. "Turquois, hardly ever used by the Greeks, was rarely employed by Græco-Roman artists" (D. OSBORNE, Engraved Gems, p. 284, New York, 1912).

[3] The ancient Egyptian turquois-mines in Wadi Maghara and Wadi Sidreh in the Sinaitic Peninsula were first discovered in 1849 by Major C. Macdonald, then visited by H. BRUGSCH (Wanderung nach den Türkisminen und der Sinai-Halbinsel, Leipzig, 1866), and examined anew in 1905 by W. M. Flinders Petrie.

Furthermore, the important question arises,— what is the antiquity of the turquois in Persia? When were the turquois mines of Persia first operated, at what time did turquois begin to play an active rôle in the culture and life of the Persian people? It is evident that all this is a matter of consequence for our *sê-ṣê* problem. I am certainly not competent to decide this question, the final solution of which must come to us from one of our co-workers in the Arabic or Persian field; but even to an outsider who has merely a scant knowledge of this subject some observations spontaneously present themselves which render him very cautious or rather skeptic in assuming, as has so often been done without any substantial evidence, a considerable antiquity for the acquaintance of the Persians with the turquois. There is, first of all, no ancient Iranian word for the turquois. Avestan literature, as far as I know, makes no allusion to it. A great authority, W. GEIGER,[3] emphasizes the fact that the minerals characteristic of Irān, as turquois, ruby, lapis lazuli, are not even mentioned in the Avesta. The lack of an Iranian word for it, with the additional absence of an ancient Sanskrit word, renders the supposition highly probable that neither the Aryans nor the Iranians had any knowledge of turquois. The word *ferozah* is New Persian, consequently not older than the ninth century; in Middle Persian or Pahlavī, the language of the Arsacids and Sassanians, no word for the turquois seems to be preserved, unless it is represented by the older form *fīrūzag* handed down by the *lapidarium* of Pseudo-Aristotle[1] and al-Bērūnī. In questioning the archæologists, we meet a slight piece of evidence. In the kurgans of Anau[2] beads of turquois together with those of carnelian and lapis lazuli have been discovered, and as it is asserted, "in the earliest culture strata." They were used as burial gifts with the skeleton of a child, and it is concluded in the publication referred to that they must have come from Persia where turquois is known both to the south of Anau and farther eastward on the plateau. But the chronology of these antiquities of Anau is somewhat uncertain, and by no means seems to me to be settled beyond doubt; aside from this, the deduction that the Anau turquoises, granted that they are what they are presented to be, *must* be of Persian origin is not at all forceful, and not proved. They *may* have come as well from Siberia where turquois was employed during the bronze age (p. 58), though the locality where the ancient Siberian turquois was mined is not yet known, or (why not?) from Tibet, or from some forgotten mine in Turkistan. Reverting to Persia and glancing over the pages of the history of the Sassanians (226–642 A. D.)[3] we look in vain for any testimony that turquois formed an essential constituent of the culture of the period. The only item I am able to trace is a statement made by A. CHRISTENSEN[4] to the effect that King Khosrau II (590 A. D.) possessed a game of backgammon (*nard*), the men of which were carved from coral and turquoises. With respect to these turquois carvings some doubts may be entertained, particularly for the reason that the Persian mineralogist Muhammed Ibn Mansūr who wrote about 1300 in the translation of Gen. SCHINDLER[5] says that in the environment of

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[1] In a collection of ancient intaglios found in the environment of Khotan and described by A. F. R. HOERNLE (A Report on the British Collection of Antiquities from Central Asia, pt. I, p. 38, Calcutta, 1899) objects of spinel and lapis lazuli occur, but none of turquois. F. GRENARD (Mission scientifique dans la Haute Asie, Vol. III, p. 143, Paris, 1898) found in a cave near Khotan a wooden image with eyes formed by rubies. In the famous treasure discovered in 1877 on the northern bank of the Oxus described by A. CUNNINGHAM (Relics from Ancient Persia, *Journal Asiatic Society of Bengal*, 1881, pp. 151–186) and O. M. DALTON (The Treasure of the Oxus, London, 1905), despite a great number of ornaments, no turquois has been traced. Also in the works on Persian art (M. DIEULAFOY, L'art antique de la Perse; PERROT and CHIPIEZ, History of Art in Persia, London, 1892) no reference is made to turquois.

[2] Compare the Sassanian precious stones as enumerated, for instance, in ED. BAUMANN, Allgemeine Geschichte der bildenden Künste, Vol. I, pt. 2, p. 538, G. STEINDORFF's Description of Sassanian Gems in *Mitteilungen aus den Orientalischen Sammlungen des Berliner Museums*, No. 4, and J. MENANT, Cachets orientaux, Intailles sassanides (*Cat. Coll. de Clercq*, Vol. II, pt. 1, Paris, 1890). In none of these publications is turquois pointed out.

[3] Ostiranische Kultur im Altertum, p. 147 (Erlangen, 1887).

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[1] J. RUSKA, Das Steinbuch des Aristoteles, p. 43 (Heidelberg, 1912).

[2] R. PUMPELLY, Explorations in Turkestan, Vol. I, pp. 60, 64, 199 (Washington, 1908).

[3] TH. NÖLDEKE, Geschichte der Perser und Araber zur Zeit der Sasaniden (Leiden, 1879); NÖLDEKE, Aufsätze zur persischen Geschichte (Leipzig, 1887); M. K. PATKANIAN, Essai d'une histoire de la dynastie des Sassanides (*Journal asiatique*, 1866, pp. 101–238); J. MARQUART, Untersuchungen zur Geschichte von Eran (Göttingen und Leipzig, 1896, 1905); K. A. INOSTRANTSEV, Sassanian Studies (in Russian, St. Petersburg, 1909). There is certainly no doubt that the ancient Persian kings and subsequently the Sassanians possessed quantities of precious stones in their treasuries and graves, but all indications are lacking as to what they were. ARRIAN (*Anabasis* VI, 29) mentions gold earrings set with precious stones as part of the treasures hoarded in the tomb of Cyrus at Pasargadæ. Compare further M. DIEULAFOY, L'art antique de la Perse, Vol. V, p. 137, and O. M. DALTON, The Treasure of the Oxus, p. 9.

[4] L'empire des Sassanides, le peuple, l'état, la cour, p. 105 (Copenhague, 1907). The source for this statement is H. ZOTENBERG, Histoire des rois des Perses, p. 700 (Paris, 1900); but the Arabic work (edited and translated by Zotenberg) written by al-Ta'ālibī (961–1038) can hardly claim any historical authenticity; it is purely legendary in character and a counterpart to Firdausī's Shāh-nāmeh.

[5] *Jahrbuch der k. k. Geologischen Reichsanstalt*, Vol. XXXVI, Wien, 1886, p. 310.

Nīshāpūr is found a stone *similar* to turquois from which chess-men are made, but that its color soon disappears. Thus, also the backgammon men of Khosrau, if at all the report may lay claim to historical authenticity, which is doubtful, may have been worked from this stone material which merely had an outward resemblance to turquois.[1] We move on safer ground in coming down to the Arabic authors of the middle ages; they indeed are the first to bring to our notice the mining of turquois in Nīshāpūr.[2] Al-Kindī, who lived in the latter part of the ninth century, as quoted by Ibn al-Baiṭār,[3] briefly mentions the turquois without alluding to Persia, nor does the oldest source for Arabic mineralogy, the *lapidarium*, wrongly connected with the name of Aristotle,[4] which according to RUSKA was composed before the middle of the ninth century. The fact that Persia is not alluded to by these two authors is not decisive; on the contrary, it is highly probable that they had the Persian turquois in their minds, for they designate it by the older Persian form *fīrūzag*, and as pointed out by RUSKA,[5] it is noticeable that in the text translated by him Persia, Khorāsān, India and China are most frequently cited among the localities for the minerals described in it.

The earliest allusion to the turquois-mines of Nīshāpūr which I am able to find is made by Ibn Haukal (978 A. D.), who based his account on Iṣṭakhri (951). He reports as follows: [6]

> "The villages and the towns in the plain around Nīshāpūr are numerous and well populated. In the mountains of Nīshāpūr and Tus are mines, in which are found brass, iron, turquoises, santalum, and the precious stone called malachite; they are said to contain also gold and beryl."

Al-Bērūnī (973–1048) seems to be the second weighty authority with a distinct reference to Nīshāpūr by stating that the turquois is brought from the mountain Ansār, one of the mountains of Rīwand near that city.[1] His contemporary al-Ta'ālibī (961–1038) expands likewise on the turquois of Nīshāpūr.[2] Then we have the testimony of Tīfāshī whose work on precious stones was written toward the middle of the thirteenth century (the author died in 1253) who says anent the turquois that it originates from a mine situated in a mountain of Nīshāpūr whence it is exported into all countries.[3] This seems to be the first clear statement of the fact that the Persian turquois of Nīshāpūr had entered into the commerce of the world. Can it be mere chance now that we find the first record of the turquois of this place in China in 1366 (p. 56), and that the Persian turquois makes its début in India only during the Mohammedan epoch? Finally we come to the Persian mineralogy of Muhammed Ibn Mansūr above referred to which according to Schindler was written about 1300, according to Ruska [4] in the thirteenth century; still later is al-Akfānī who died in 1347–48, and who in his treatise on precious stones deals also with the turquois.[5]

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[1] J. DE MORGAN (Mission scientifique en Perse, Vol. IV, p. 320, Paris, 1897) figures a bas-relief of Takht-i Bostān representing Khosrau II Parwēz (591–628) in full armor on horseback and interprets the medial row of stones inlaid in the sheath of the sword as turquoises. There is no color displayed on this stone bas-relief, and this view seems wholly arbitrary; it is rejected as fantastic by F. SARRE and S. HERZFELD, Iranische Felsreliefs, p. 203 (Berlin, 1910).

[2] Name of a city and province in northern Khorāsān. The city was founded by Shāpūr II (309–379) whose name forms the second element in the name of the city. The Old Persian name is Nēw-Shāpūr, the word *nēw* meaning good. The New Persian form is *Nēshāpūr*, at present *Nīshāpūr*, Arabic *Naisābūr* (compare NÖLDEKE, Geschichte der Perser und Araber zur Zeit der Sasaniden, pp. 59, 67; an interesting sketch of the history of the city is given by A. V. W. JACKSON, From Constantinople to the Home of Omar Khayyam, pp. 246–260, New York, 1911).

[3] L. LECLERC, *l. c.*, Vol. III, p. 51.

[4] J. RUSKA, Das Steinbuch des Aristoteles, p. 151.

[5] *L. c.*, p. 43.

[6] A. V. W. JACKSON, *l. c.*, p. 254.

There is also the evidence furnished by Marco Polo [6] who passed through Persia in 1294 and says of the kingdom of Kermān that the stones called turquoises are produced there in great abundance; they are found in the mountains, where they are extracted from the rocks. Gen. A. Houtum Schindler[1] to whom we owe an excellent description from the geological viewpoint of the Persian turquois-mines has not solved the problem as to the antiquity of the mining operations; the late report of Ibn Mansūr is the only document quoted by him.[2] In one passage (p. 307) we read the general remark: "Seit Jahrtausenden ist in diesen Gruben gearbeitet worden," which is no more than a personal impression. We live in a skeptic age and are not willing to believe so easily in millenniums, if no evidence of hard and cold facts is advanced. Every human activity is defined by time; language and history seem to militate against such an unfounded surmise.[3] These observations on the history of turquois in Persia form another reason why I am not at all sanguine in accepting the explanation of *sê-sê* by turquois when such early texts as *Pei shi*, *Sui shu*, and *T'ang shu* come into question and refer to a time when it must be doubted, at least for the present, that turquois was known in Persia or had any significance in her culture. The Chinese accounts plainly refer to Sassanian Persia, while all references to turquois in Persia, at least in the present state of our knowledge, are post-Sassanian.

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[1] E. Wiedemann, *Der Islam*, Vol. II, 1911, p. 352.

[2] Wiedemann, Zur Mineralogie im Islam, p. 242 (Erlangen, 1912).

[3] L. Leclerq, *l. c.*

[4] *L. c.*, p. 31. J. v. Hammer has translated an extract from this work in *Fundgruben des Orients*, Vol. VI, pp. 126–142, Wien, 1818; the text has not yet been edited. Compare Wiedemann, *l. c.*, p. 208.

[5] Edited by P. L. Cheikho (*Al-Machriq*, Vol. XI, 1908, pp. 751–765). Compare Wiedemann, *Mitt. d. deutschen Ges. für Geschichte d. Med. und Nat.*, Vol. VIII, pp. 509–511. Translation by Wiedemann, Zur Mineralogie im Islam, p. 225 (Erlangen, 1912). Bretschneider (*China Review*, Vol. V, 1876, p. 124) identifies the Persian vase "reflecting what is going on in the world" (mentioned in the Annals of the Ming Dynasty) with the vase of Djemshid frequently spoken of by the Persian poets and said by Rashid-eddin (1247–1318) to have been made of turquois. This identification can hardly be correct, if the tradition holds good that the Persian vase had "the property of reflecting light in such a way that all affairs of the world could be seen." Turquois is dense, opaque, not at all transparent (in composition a hydrous phosphate of aluminum containing water, 20.6 per cent, alumina, 46.8 per cent, and phosphorous oxide, 32.6 per cent), and thus in composition as well as opacity, differs from most other gems (O. C. Farrington, Gems and Gem Minerals, p. 170, Chicago, 1903).

[6] Yule and Cordier, The Book of Ser Marco Polo, Vol. I, p. 90. Marco Polo's itinerary in southern Persia has been elucidated by Gen. A. Houtum Schindler (*Journal Royal Asiatic Society*, 1881, pp. 1–8, and 1898, pp. 43–46), further by G. Le Strange (The Cities of Kīrmān, *ibid.*, 1901, pp. 281–290). On p. 2 of the first of these papers, Schindler has devoted a note to the turquois-mines of the province of Kermān, stating the various localities where they are found; at a place, twelve miles from Shehr-i-Bābek, are seven old shafts, now for a long period not worked, the stones of these mines being of a very pale blue, and having no great value. The inferiority of the Kermān turquois is emphasized also by the Chinese author T'ao Tsung-i in 1366 (see p. 57). And then, one will make us believe that the turquois should be recognized in Pliny's callais "the best sort of which occurs in Carmania," as if there were no other stones to be found in the big country Carmania, and as if it had been proved that turquois was mined there in the first century. But Marco Polo evidently is the first authority with such a report, and from Pliny to Marco Polo there is a far cry. The Arabic author al-Ta'ālibī (961–1038) expressly states that turquois is found only near Nīshāpūr (Wiedemann, Zur Mineralogie im Islam, p. 242). Major P. M. Sykes (Historical Notes on South-East Persia, *Journal Royal Asiatic*

In our attempts to identify the names of stones mentioned in ancient

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Society, 1902, p. 942) who has studied the archæology of the Kermān region reports on the tombs: "In each tomb were a yellow jar of pottery, round bowls of three sizes, a pair of bracelets, two pins, and some arrow and spear heads, all of which were of bronze except the vessels. In addition, two or three carnelian gems were found, and some small silver earrings and bracelets. The custom of placing a carnelian in a dead man's mouth, with the names of the twelve *Imām* engraved on it, is one that obtains nowadays." There is no report of a find of turquoises in a grave of the Kermān region.

[1] Die Gegend zwischen Sabzwār und Meschhed in Persien (*Jahrbuch der k. k. geologischen Reichsanstalt*, Vol. XXXVI, pp. 303–314, Wien, 1886).

[2] When Ibn Mansūr says that the best mine of those at Nīshāpūr is the one discovered by Isaac, the father of Israel, and hence called Isaac's mine, this is certainly a legend without historical value. The account of Ibn Mansūr seems to be pieced together from different sources; the *lapidarium* of Pseudo-Aristotle is evidently utilized (for example, in the statement that turquois is light and brilliant in clear weather, but dim and dull when the sky is clouded). According to Ruska (*l. c.*, p. 35), matter and arrangement of his work largely depends on Tīfāshī. Regarding the Chinese, Ibn Mansūr remarks that they like the *tarmaleh* (a word queried by Schindler), turquoises intersected by other stone, and employ these for the adornment of their idols and women. This is apparently an error and should read "Tibetans" instead of Chinese (compare p. 13). Travelers who visited the mines are quoted by A. V. W. Jackson (*l. c.*, p. 259).

[3] The last (eleventh) edition of the *Encyclopædia Britannica* gives two items of information of a contradictory character. In Vol. XIX (p. 710) mention is made of Mādan, 32 miles N. W. of the city of Nīshāpūr, "where the famous mines are which have supplied the world with turquoises for at least 2,000 years." A more moderate attitude is observed in Vol. XXVII (p. 483) where it is said: "In Persia the turquois mines have been worked for at least eight centuries."

records we must never lose sight of the plain facts of archæology, history, and mineralogy. Taking a broader view of the subject we find that ruby and lapis lazuli have been the most prominent jewels of Irān since ancient times, and that both are well attested by the presence of ancient authentic specimens[1] and traceable to a well defined locality. The great jewel-producing district within equal proximity of Sogdiana, Persia and Khotan was the region of Badakshān (in Chinese *P'a-to-shan*), north of the Hindu Kush mountains, well known to the Chinese during the T'ang period, and to every modern mineralogist as a center for the production of two precious stones — lapis lazuli and the balas ruby or spinel.[2] The former stone entered the horizon of the Chinese at the T‘ang period, and likewise from the regions of the Western Turks.[1] As it has a name of its own (*kin tsing*),[2] and as besides it no other

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[1] Compare p. 38, note 1.

[2] Max Bauer, Precious Stones, pp. 278, *et seq.* (German original, Edelsteinkunde, 2nd ed., p. 374); O. C. Farrington, Gems and Gem Minerals, pp. 96, 202. T, Wada (*Beiträge zur Mineralogie von Japan*, No. 1, p. 20, Tōkyō, 1905) describes spinels originating from China, and R. Pumpelly (Geological Researches, p. 118, *Smithsonian Contributions to Knowledge*, Vol. XV, Washington, 1867) seems to have encountered spinels in Yün-nan. Marco Polo (ed. Yule and Cordier, Vol. I, p. 157) has described the ruby and the lapis lazuli mines. They are mentioned by the Arab geographers Iṣṭakri and Ibn Haukal in the tenth century (O. M. Dalton, The Treasure of the Oxus, p. 9, London, 1905). Ibn Haukal's passage has been translated by Wiedemann (Zur Mineralogie im Islam, p. 236, Erlangen, 1912). The Arabic geographer Yāqūt (1179–1229) and the historian Maqrīzī (1365–1442) impart notes on the balas ruby of Badakshān (Wiedemann, *ibid.*, pp. 235–6); al-Ta'ālibī (961–1038) mentions it (*ibid.*, p. 243). The ancients were familiar with the spinel as evidenced by antique intaglios, but its designation in classical times is not known according to H. Blümner (Technologie und Terminologie der Gewerbe und Künste bei Griechen und Römern, Vol. III, p. 236, Leipzig, 1884); but H. O. Lenz (Mineralogie der alten Griechen und Römer, p. 17, Gotha, 1861) includes the spinel under the Greek word *anthrax* (likewise Daremberg and Saglio, Dictionnaire des antiquités grecs et romains, Vol. II, p. 1462, and Pauly's Realenzyklopädie, Vol. XIII, col. 1108). Arabic and Armenian authors relate a legendary tradition that at the time of the dynasty of the Abbassides a terrific earthquake shattered a mountain in Badakshān, in which the spinels appeared (K. P. Patkanov, *l. c.*, pp. 19–20). The great antiquity of the mining operations in Badakshān is illustrated by the wide diffusion in early times of lapis lazuli. In the words of Marco Polo, that of Badakshān is the finest in the world; Yule (Vol. I, p. 162) comments that the mines of *Lājwurd* (whence *l'Azur* and *Lazuli*) have been, like the ruby mines, celebrated for ages. Max Bauer (Precious Stones, p. 442) states that the material which is not sent to Bokhāra (whence it is traded to Russia) goes, together with rubies of the same region, to China and to Persia, and that the lapis lazuli said to occur in these countries, as well as in Little Bokharia and Tibet, has probably been imported from Badakshān. Moreover, according to this author, the material sold in other parts of Asia, for example, in Afghanistan, Beluchistan, and India, and stated by travelers to occur in those regions, in all probability is imported from the locality in the proximity of the Upper Oxus; the lapis lazuli from which the ancient Egyptian scarabs were cut, as Bauer says, presumably came from Badakshān, as did also the material much used elsewhere in ancient times. The early use of lapis lazuli in ancient Babylonia is well attested by numerous finds (P. S. P. Handcock, Mesopotamian Archæology, pp. 76, 102, 315, even for the earliest Sumerian period, p. 340) and the mineralogical analyses of Heinrich Fischer (H. Fischer and A. Wiedemann, Ueber babylonische Talismane, p. 4, Stuttgart, 1881). It is interesting to note among the beads of Sumerian necklaces coral, lapis lazuli, mother-o'-pearl, and agate — all favorite objects of the Tibetans, to the exclusion of turquois, which evidently belongs to a much more recent stratum of culture in Asia. The origin of Babylonian lapis lazuli seems not yet to have been satisfactorily established. Fischer suggested Bokharia; H. Blüm-

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NER (*l. c.*, Vol. III, p. 275) basing his opinion on Pliny's statement that the best kind occurs in Media (*apud Medos*) is inclined to think of Tibet where it is found at present. This fact is certainly correct (see p. 17, note 2), but Tibet cannot come into question in the times of antiquity, and it seems preferable, at least for the present, to join MAX BAUER in the opinion that the mines of Badakshān are responsible also for Babylonian lapis lazuli. Prehistoric occurrence of lapis lazuli in Beluchistan is mentioned by NOETLING (*Zeitschrift für Ethnologie*, Vol. XXX, 1898, *Verhandlungen*, p. 470); in Armenia by BELCK and LEHMANN (*ibid*, p. 590). R. LEPSIUS (Les métaux dans les inscriptions égyptiennes, p. 31, Paris, 1877) derives the lapis lazuli used by the ancient Egyptians from Badakshān. As to India, the case may be more precisely made out. There, the stone does not seem to be indigenous. G. WATT (A Dictionary of the Economic Products of India, Vol. IV, p. 587) says: "Though not known with certainty to occur in India, it is imported into the country, where it is employed for several purposes." The Sanskrit word *rājavarta* or *lājavarta* (Hindustani *lājward*, Behar *lājburud*, Guzerati *rājāvaral*) is plainly derived from Persian *lāzuward* (L. FINOT, Les lapidaires indiens, p. XVIII, connects it with Arabic *lāzurd*), and the five names enumerated for the stone in the *Rājanighaṇṭu* (R. GARBE, Die indischen Mineralien, p. 90), though all couched in a Sanskrit form (with the meaning "suitable for a king's forehead, forehead-jewel") are re-interpretations based on that foreign word (the Petersburg Sanskrit Dictionary, smaller edition, has still another composite name *suvarṇābha*). TAVERNIER (ed. by V. BALL, Vol. II, p. 156, London, 1889) who wrote in 1676 makes a somewhat vague statement: "Towards Tibet, which is identical with the Caucasus of the Ancients, in the territories of a *Rāja* beyond the Kingdom of Kashmir, there are three mountains close to one another, one of which produces gold of excellent quality, another *grenat*, and another *lapis*." The editor BALL is inclined to think that the *lapis* mine here referred to is near Firgāmu in Badakshān. Lapis lazuli occupies a place in Indian antiquity, particularly among the Buddhists, but this subject is still in need of special investigation.

[1] CHAVANNES, Documents, p. 159, and *T‘oung Pao*, 1904, p. 66. But lapis lazuli was perhaps known to the Chinese to a certain extent from the second century A. D. (compare F. HIRTH, *Zeitschrift für Ethnologie*, Vol. XXI, 1889, *Verhandlungen*, p. 500, or Chinesische Studien, p. 250). HIRTH refers to the "gold girdles set with blue stones from Hai-si" presented to the Chinese Court in 134 A. D. by the king and minister of Kashgar, further to a definition in the glossary *T‘ung su wên* from the end of the second century where the expression "to paint the eyebrows" is explained as a cosmetic yielded from blue stone (*ts‘ing shi*) where ultramarine, a pigment obtained from lapis lazuli, is evidently in question. This is well confirmed by the report of the *Sui shu* on the country of Ts‘ao identified by HIRTH with Badakshān or the plateau of the Pamir (an identification overlooked by CHAVANNES, Documents, p. 130), where it is said that Ts‘ao produced among other articles *ts‘ing tai*, that is, ultramarine for cosmetic purposes. HIRTH does not state the fact that Badakshān is the old classical land of lapis lazuli; but just this lends force to his conclusion that the ancient cosmetic used by the Chinese was of mineral, and not, as later Chinese authors believed, of vegetal origin.

[2] As I expect to show on another occasion, there is, besides *kin tsing*, an ancient term *kin sing shi*, "stone with golden stars," for the designation of lapis lazuli. This is mentioned as a product of Tibet (*T‘u-po*) in *Kiu Wu tai shi* (Ch. 138, p. 1 b), as a product of Khotan in the Geography of the Ming Dynasty (*Ta Ming i t‘ung chi*, edition of 1461, Ch. 89, fol. 25 a), and as a product of Sze-chou fu (in the province of Kuei-chou) in the Geography of the Ts‘ing Dynasty (*Ta Ts‘ing i t‘ung chi*, Ch. 398, p. 3 b); compare further *Pên ts‘ao kang mu*, Ch. 10, p. 10 a. The word *kin sing* reflects the same notion as connected by the ancients with the same stone (called *sappheiros*, *sapphirus*, a word of Semitic origin: O. SCHRADER, Reallexikon, p. 152), described by them as a blue stone with brilliant dots of gold (the small quantity of sodium sulphide present in the stone being taken for gold), and likened to the starry sky (compare BLÜMNER, *l. c.*). The modern Chinese name for lapis lazuli is *ts‘ing kin shi*, that is, "dark-blue gold stone." In the Dictionary of Four Languages by the Emperor K‘ien-lung, this word is rendered into Manchu by *nomin*, Tibetan

important jewel is found within this dominion than the balas ruby or spinel, no other alternative can be seen at present than that, generally speaking, the *sê-sê* is in all probability to be identified with the latter; while in some cases where carvings and building material are mentioned, as will be seen, the onyx might be conjectured.

I have further arrived at the conclusion that, as far as precious stones are concerned, two different species should be understood by the name *sê-sê*,— as far as the Iranian regions are involved, the balas ruby of Badakshān; and, as far as ancient Tibet comes into question, in all likelihood the emerald.

Further evidence may first be adduced for the proposed identification with the balas ruby. The balas ruby is now called in Chinese *pi-ya-se*,[1] correctly translated as early as 1820 by ABEL-RÉMUSAT[2] with "le rubis balais"; the Chinese word, according to this author, is derived from *balash* or *badaksh*, whence, as he says, the name of the country Badakshān is derived; but more probably, the name of the jewel is derived from the name of the locality.[3]

The recent valuable paper of E. WIEDEMANN,[4] allows us to trace the etymology of this Chinese word. Discussing the balas ruby of Badakshān (in Arabic *al balachsh*), al-Berūnī maintains that the best

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by ***mu-men***, Mongol by ***nomin*** or ***momin***, all of which have the same meaning. ABEL RÉMUSAT (Histoire de la ville de Khotan, p. 168) adds the Uigur word ***nachiver*** which he says is derived from Persian ***ladjiver*** (***lazvard***). The English and Chinese Standard Dictionary (Vol. I, p. 1308, Shanghai, 1910) translates lapis lazuli by ***lan liu-li***. In the Mongol period the Chinese name for lapis lazuli was ***lan ch'i*** (BRETSCHNEIDER, Mediæval Researches, Vol. I, p. 151, and *Chinese Recorder*, Vol. VI, 1875, p. 16) doubtless derived from the Persian or Arabic word. It seems to me that the character ***lan*** "orchid" (No. 6721) used by Ch'ang Tê in writing this word is an error for ***lan*** "indigo, blue" (No. 6732); the name of the capital of Badakshān where lapis lazuli was mined was ***Lan shi***, "Blue Market" (CHAVANNES, *T'oung Pao*, 1907, p. 188), a designation which apparently refers to the blue color of lapis lazuli.

[1] GILES, Dictionary, No. 9009, who translates "a kind of cornelian", which is not correct.

[2] Histoire de la ville de Khotan, p. 168. The identification is based on the Dictionary in Four Languages (see below p. 48, note).

[3] YULE and BURNELL (Hobson-Jobson, p. 52) state in regard to the word ***balas***: "It is a corruption of ***Balakhshī***, a popular form of ***Badakhshī***, because these rubies came from the famous mines on the Upper Oxus, in one of the districts subject to Badakshān," and quote also Ibn Baṭūṭa as saying that the mountains of Badakshān have given their name to the Badakshī ruby.— EITEL (Handbook of Chinese Buddhism, p. 131), I believe, is quite right in recognizing in ***rohitaka*** or ***lohitaka*** the Sanskrit word for the balas ruby, for the other Sanskrit words employed for the ruby, as shown by L. FINOT (Les lapidaires indiens, p. XXXIX), refer to such species as are found in India. We are much in need of a careful and critical study of all the names of precious stones to be found in Buddhist Sanskrit and Pāli literatures, and these should certainly be examined in connection with the corresponding Chinese and Tibetan renderings; the Buddhist nomenclature, in many cases, deviates from that of the Indian mineralogists.

[4] Ueber den Wert von Edelsteinen bei den Muslimen (*Der Islam*, Vol. II, 1911, p. 349).

sort is the *pijāzakī*, that is, the one coming from the district of Pijāzak. I am inclined to think that we may look upon this word as the source of the Chinese transcription *pi-ya-se*, whereby its meaning is moreover confirmed. It is true the Chinese word is not traceable earlier than the eighteenth century, but it is doubtless a much more ancient word of the colloquial language which for this reason was not registered in the standard dictionaries; it is, however, entered, as numerous other colloquial words, in the "Dictionary in Four Languages" published by the Emperor K'ien-lung. Mention is made of *pi-ya-se* in the "Statutes of the Manchu Dynasty" (*Ta Ts'ing hui tien t'u*, Ch. 43, p. 5) where they are granted as a privilege to all imperial court-ladies to be worn on their sable caps.[1] There is, however, an older trace of the word in a source of the Mongol period where, in my opinion, it has been misjudged by Bretschneider. The Chinese traveler Ch'ang Tê, who was despatched in 1259 by the Mongol Emperor Mangu as envoy to his brother Hulagu, king of Persia, and whose diary, under the title *Si shi ki*, was edited in 1263 by Liu Yu, reports that a precious stone by the name *ya-se* of five different colors and of very high price is found on the rocks of the mountains in the south-western countries. BRETSCHNEIDER[2] is inclined to identify this word with the Arabic *yashm* or *yashb*, our word jasper, which seems to me very improbable. The stone *ya-se* is mentioned by Ch'ang Tê together with lapis lazuli

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[1] The character *pi* in the word *pi-ya-se* may explain also why the *sê-sê* are designated by some authors as *pi* "green," which may simply be due to a reminiscence of the word *pi-ya-se* where the word *pi* enters as an attempt at reproducing a foreign sound. Besides, al-Bērūnī, in the passage quoted by WIEDEMANN, speaks of four color variations in the balas ruby,— red, violet, *green* and yellow. The Armenian *lapidarium* (K. P. PATKANOV, *l. c.*, p. 19) ascribes to spinels a red color, the colors of the garnet, of fire, of vinegar, of wine, of the scorpion, and of peas. A. BOETIUS DE BOOT (*l. c.*, p. 149) states in regard to the color of *Rubinus Balassius:* "Habet iste Rubinus laccæ florentinæ, aut cremesinum colorem, ita ut parum cærulei coloris vero rubro admixtum videatur, rosei coloris rubentis instar." R. MIETHE (in KRÄMER, Der Mensch und die Erde, Vol. V, p. 377) describes spinels as black or brown-black, frequently brownish, rarely green and blue. O. C. FARRINGTON (Gems and Gem Minerals, p. 96), besides red, gives also the colors orange, green, blue, indigo, white and black. MAX BAUER (Precious Stones, p. 297) has the following: "Spinels of a rose-red or light shade of color inclined to blue or violet are referred to as 'balas rubies.' They not infrequently combine with this character a peculiarly milky sheen which considerably detracts from their value. Stones the color of which is more decidedly blue or violet resemble, although much paler, some almandines, and are known as 'almandine spinels.' Violet spinels, which are not too pale in color, often resemble both the true amethyst and the 'oriental amethyst,' and indeed have sometimes been put on the market under the latter name." Blue and black spinels are discussed by the same author on p. 299. Red and purple balas rubies are distinguished also by Yang Shên (*Ko chi king yüan*, Ch. 33, p. 1) who, according to MAYERS (Chinese Reader's Manual, p. 270) lived from 1488 to 1559 (GILES, Biographical Dictionary, p. 912, sets the date of his death at 1529; but WYLIE, Notes on Chin. Lit., p. 154, assigns 1544 to one of his works).

[2] Mediæval Researches, Vol. I, p. 151, and *Chinese Recorder*, Vol. VI, 1875, p. 16 (where the Chinese characters are given).

(*lan-ch'i*) as occurring in the same locality, and since Badakshān is *the* locality producing lapis and balas ruby, the greater probability is that Ch'ang Tê's *ya-se* is identical with *pi-ya-se*, the balas ruby of Badakshān. The fact that Ch'ang Tê, in writing the name, employs other characters than those in use at later times is certainly not in the way of this identification. On the other hand, as stated above (p. 33, note 5), Ch'ang Tê notices in the palace of the Caliph *sê-sê* together with lapis lazuli, and hence it may be concluded that his *sê-sê* is identical with *ya-sê*, *i.e.* that *sê-sê* is the balas ruby of Badakshān. And if it is permissible to interpret the word *liu-li*, occurring in the account on Persia in the *Sui shu* (Ch. 83, p. 11 b) and having its place between coral, agate and crystal, in the sense of lapis lazuli, we are there confronted with an analogous case. The great antiquity of lapis lazuli in Egypt and Western Asia, corresponding to its relatively early appearance in China, leads one to the inevitable conclusion that also balas ruby, originating from the same mines, must be of proportionately equal age.

From the few accounts we have in regard to the *sê-sê* — there is no contemporaneous description of them — we cannot surely be too positive on the subject of identification. But the spinel or balas ruby tentatively proposed suits the situation far better than the turquois, for it is a precious stone, it was found (and still is found) in the heart of those regions participating in the property of *sê-sê*, and is well authenticated historically and archæologically. The word *sê-sê* is evidently not Chinese, but derived from a foreign language; it may be either a Chinese attempt at transcribing a Turkish or Persian designation of the stone, or the name of some locality, mountain or river.[1]

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[1] Marco Polo's designation of the mountain where the balas ruby is mined, *Syghinan*=*Shignān*, is very suggestive as a possible foundation of the word *sê-sê* (Cantonese: *sok-sok*). It is also significant that the ancient Chinese name for Shighnān is recorded in the Annals of the T'ang Dynasty in the form *Sê-ni* or *Sê-k'i-ni*, and that this syllable *sê* is written with the same character as used in the jewel *sê-sê* (see CHAVANNES, Documents sur les Tou-kiue occidentaux, pp. 162, 322). It is therefore possible, after all, that *sê-sê* derives its name from this locality and means "stone of Shighnān,"— a case from a philological point of view analogous to the above mentioned *pijāzakī* and *badakshī*. During the Mongol period the balas ruby is designated *la* in the *Cho keng lu* (Ch. 7, p. 5 b, edition of 1469), — a word which is traced by BRETSCHNEIDER (Mediæval Researches, Vol. I, p. 173) to Persian *lāl*. The Chinese author T'ao Tsung-i — a fact not mentioned by BRETSCHNEIDER — states that this word is only dialectic. The adoption of this foreign word indicates a change in the commercial conditions; in the T'ang period the balas rubies were traded to China from the country of the Western Turks (Khotan), in the Mongol period from Persia. An error of Bretschneider here deserves correction. The *Cho keng lu* enumerates four red stones and expressly says that they come from the same mine; since the balas ruby is mined in Badakshān, the three others, *viz.*, *pi-che-ta*, *si-la-ni*, and *ku-mu-lan*, must be derived from the same locality, and it is impossible to conjecture with Bretschneider that *si-la-ni* probably means "from Ceylon"— a view untenable also for philological reasons. The *pi-che-ta* corresponds to Arabic *bigādī*, "garnet" (WIEDEMANN, *Der Islam*, Vol. II, p. 352, and Zur Mineralogie im Islam, pp. 217, 236, Erlangen, 1912). If Bretschneider adds that nowadays the

We noticed from the statements of the *Pei shi* and *Sui shu* that *sê-sê* are attributed to the Persians, and from the *T'ang shu* that these jewels were known in Syria. In the epoch of the T'ang dynasty (618–906) the three great religions of Western Asia, Mazdeism, Nestorianism and Manicheism reached a high degree of expansion and spread over

name for ruby in China is ***hung pao shi*** ("red precious stone"), it should be understood that this is not the balas ruby, but the Burmese ruby (see also G. E. GERINI, Researches on Ptolemy's Geography, pp. 39, 741, London, 1909). Russian manuscripts of the seventeenth century mention expressly "Chinese *lāl*" (K. P. PATKANOV, *l. c.*, p. 21) which goes to show that spinels really existed in China and were traded from there to Russia. JULIUS RUSKA (Das Steinbuch des Aristoteles, p. 32) doubts the correctness of the identification of the Persian word ***lāl*** with the spinel, and is inclined to regard it as tourmalin, as it is stated that the colors of the stone are red, yellow, violet and green (which, however, is no conclusive argument), that the same stone is often half red and half green, that it is found in a matrix of white stone, and smaller stones frequently lie around a bigger one. I have no judgment on this matter, but wish to point out on this occasion that it is impossible to reach any certain results in this line from the Chinese field of research, before our colleagues in the Persian and Arabic quarters have satisfactorily settled their questions and furnished us with the material to build our conclusions. From a purely philological point of view, however, it does not appear that Ruska's opinion can be upheld. There can be no doubt that the word ***pijāzakī*** denotes the balas ruby, and that the Chinese word ***pi-ya-se*** phonetically corresponds to it. The Imperial Dictionary in Four Languages renders this Chinese term by the Tibetan and Mongol words ***nal*** and Manchu ***langca*** (LAUFER, Jade, p. 109, note 3); these two forms are nothing but variations of the Persian word *lāl*, and consequently Persian *lāl* must designate the balas ruby, so it does also in Osmanli and some other Turkish dialects which have adopted this word. Likewise in Russian the spinel was known under the name *lāl* in the seventeenth century (K. P. PATKANOV, *l. c.*, p. 20). Dr. Ruska, to whom I submitted this observation, was good enough to write me that he does not mean to reject in principle the interpretation of *lāl* by spinel, but mainly wishes to point out the difficulties of the case arising from the confused descriptions of the stone. He thinks the green color is so rare in this mineral that it is impossible that the same stone should be often half green and half red, a feature which, however, not seldom occurs in tourmalin (especially with neutral, colorless intermediary zone). He further states that he has no doubt of the correctness of the equation ***pi-ya-se*** = ***pijāzakī*** and ***nal*** = ***lāl***, and obligingly refers to the fact that the word ***pijāzakī*** is contained also in VULLERS' Lexicon Persico-Latinum with the additional form ***piyāzī*** which comes still nearer to the Chinese word. According to VULLERS, ***pijāzek*** is the name of a district where are the mines of the *lāl*. As the word ***pijāz*** means "onion," it was wrongly translated into Arabic as ***baṣalī*** "onion-like *lāl*," and even ***pijāzī*** was perhaps understood in this sense. Dr. Ruska refers to a study on Qazwīnī now in print, where he has commented on this subject. Meanwhile E. WIEDEMANN (Zur Mineralogie im Islam, p. 216) has commented on Dr. Ruska's opinion in a translation of al-Akfānī's mineralogy, who identifies ***al-balachsh*** with Persian *lāl*. Wiedemann, on the ground of the specific gravities given by al-Khāzinī, holds that in this case *lāl* should be translated by ruby-spinel, but admits that in other cases it could signify tourmalin. With obliging courtesy Dr. Ruska has recently sent me a proof of the note previously referred to (the above remarks were jotted down a year ago) where he says that the identification of the *lāl* with the ***balachsh***, the stone of Badakshān, and with the ***rubis balais*** is confirmed by al-Akfānī; but he adds: "This does not exclude a freer usage of the word for all possible red gems, for who might say that the only then known means of their distinction, the determination of specific gravity, has always been employed?" This result is entirely satisfactory, and we return to the former conclusion that *lāl*, in general, designates the balas ruby, with the restrictions made by Dr. Ruska. In no case can it certainly be expected that any Oriental names of minerals, plants, or animals will exactly coincide with our scientific species; it is always necessary to grant the former a certain latitude. But for purposes of translation we have to adhere to the one principal notion connected with the object.

Central Asia, also into China. A curious document allows us to establish the fact that it was representatives of these religions, in all likelihood Manicheans, who brought these jewels to China. This text occurs in the *Shu tien*, a collection of interesting notes on the province of Sze-ch'uan, compiled in 1818 by Chang Chu-pien (4 vols., reprinted in 1876). The passage (in Ch. 8, p. 5)[1] is derived from the *Hua yang ki*, a work containing records relative to Sze-ch'uan, whose time and authorship is not known to me.[2] The text runs as follows: "The family K'ai ming[3] erected a several-storied building of seven precious objects; there were screens composed of connected genuine pearls. At the time of Emperor Wu (B. C. 140–87) of the Han dynasty, a conflagration in the district of Shu (Sze-ch'uan) destroyed several thousand houses, and even several-storied houses were consumed by the flames. At the present time people constantly find genuine pearls preserved in the sandy soil.—Chao Pien,[4] in his work *Shu tu ku shi* ("Ancient Affairs of the Capital of Sze-ch'uan"), says: "The Monoliths are outside of the west gate of the Yamen, two shafts being extant. This is the site of the building of the genuine pearls. Formerly people of Central Asia (*Hu jên*) erected at this spot a Temple of Ta Ts'in (*Ta Ts'in sze*) with gates and storeys consisting of ten rooms. By means of genuine pearls and bluish jade (*ts'ui pi*) which were strung, they made screens. Later on, this building was destroyed and fell into ruins. Even now whenever a big rain has fallen, people pick up at this place genuine pearls, *sê-sê*, gold, blue jade, and strange things. The poet Tu Fu (712–770), in his 'Poem on the Monoliths' has the verse: 'During a rainfall, they constantly obtain *sê-sê*,' which is an allusion to this affair."[5]

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[1] It is quoted with exactly the same readings also in *Ko chi king yüan*, Ch. 32, p. 7. The same story is narrated in the *Nêng kai chai man lu* (edited in *Shou shan ko ts'ung shu*, Vols. 70, 71; Ch. 7, p. 22 b) by Wu Tsêng of the twelfth century (WYLIE, Notes on Chinese Literature, p. 160), which goes to prove that the story was known in the Sung period. Also Wu Tsêng connects this tradition with the verse of Tu Fu (712–770) relative to the finds of *sê-sê* at a rainfall; this is the heading of his essay, and the story is given in explanation of the poem which in our text, as translated above, follows at the end. If this interpretation is correct, the event of the destruction of the temple of Ta Ts'in must have happened contemporaneously with, or prior to the age of, Tu Fu. Thus, the Ta Ts'in temple here in question may have been founded toward the end of the seventh or in the beginning of the eighth century.

[2] It is not identical with the *Hua yang kuo chi*, ancient records of Sze-ch'uan by Ch'ang K'ü of the Tsin dynasty.

[3] According to an information received by M. PELLIOT, *K'ai ming* is the name of the later Emperor Ts'ung; he is identical with the personage called Pie Ling in GILES (Biographical Dictionary, No. 2071). His record is contained in *Hua yang kuo chi* (ch. 3, p. 2).

[4] An official of the Sung period (994–1070), celebrated for his integrity and benevolence, popularly known as "the Censor with the Iron Face," acted as governor of Sze-ch'uan (GILES, Biographical Dictionary, p. 73). The *Nêng kai chai man lu* designates him by his posthumous name Chao Ts'ing-hien.

[5] Wu Tsêng, after giving the text of this tradition as above, winds up with a comment on the precious stones and pearls of the country of Ta Ts'in (the Roman

Ta Ts'in is the peculiar name hitherto unexplained in its origin by which the Roman Orient was known to the Chinese, a subject ably and thoroughly discussed by Prof. HIRTH in his book "China and the Roman Orient" on the basis of all available documents. The "Ta Ts'in temples or churches" are first mentioned in Chinese records for the year 631 when the magus Ho-lu arrived from Persia at Si-ngan fu, and an imperial edict ordered to establish in the capital a temple of Ta Ts'in.[1]

In the year 745 an edict was issued that the Manichean churches heretofore called "Persian temples" should throughout the empire change this designation into "temples of Ta Ts'in."[2] The tenor of this edict leaves no doubt that the Manicheans are understood: for the purpose of the imperial order is to do justice to the true name of their religion; their places of worship had heretofore been called "Persian" for the mere reason that they had hailed from Persia, but the foundation of their religion was Christian and had originated in Ta Ts'in, in Syria. I am therefore inclined to think that also in the above text the "Temple of Ta Ts'in" should be identified with a Manichean church. If this document can be looked upon as authentic we here have the interesting fact, which I believe was not known before, that the Manicheans, probably in the first part of the eighth century, had extended their settlements to far-off Sze-ch'uan, and the point at issue in this connection is that they must have brought over to Sze-ch'uan a large quantity of precious stones, among these *sê-sê* or balas ruby. In this case it should rather be positively asserted that the turquois is out of the question. The mere idea that the Manicheans should have employed turquois, and especially in combination with genuine pearls and precious jades, for the decoration of their churches, seems absurd. Precious stones played a significant part in the religious system and symbolism of the Manicheans, and as their religious notions centered around the

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Orient) and concludes that the founders of the temple have therefore been indeed men from the country of Ta Ts'in. It will be seen from the *P'ei wên yün fu* (Ch. 93 B, p. 85) that under the word *sê-sê* a passage from the History of the Liao Dynasty (*Liao shi*, chapter on Rites) is quoted to the effect that "Jo-han selected an auspicious day to practice the ceremony of *sê-sê*, in order to pray for rain." This word *sê-sê* has nothing to do with the jewel in question, but is a word of the Tungusic language of the Khitan, *seseli* (explained as such in *Liao shi*, Ch. 116, p. 4 b), meaning a ceremony of rain-prayer, in which no stone at all is employed but a willow at which a lance is thrown by the emperor, the princes and ministers. The ceremony is fully described in the second chapter of the *Liao shi* (see H. C. V. D. GABELENTZ, Geschichte der grossen Liao, p. 31; further *Liao shi*, Chs. 27, p. 3; 55, p. 1 b; 56, p. 1 b). The K'ien-lung scholars identify the Khitan word with Manchu *sekseri* (*K'in ting Liao shi yü kiai*, Ch. 10, p. 1).

[1] CHAVANNES, Le Nestorianisme (*Journal asiatique*, 1897, p. 61).

[2] This edict has been translated by CHAVANNES (*l. c.*, p. 66) and PAUL PELLIOT (*Bulletin de l'Ecole française d'Extrême-Orient*, Vol. III, 1903, p. 670).

dualistic principle of light and darkness, it is evident that brilliant jewels were conceived by them as emblems of light and for this reason were employed in their churches.[1]

Several examples of this kind may be gleaned from the newly discovered Manichean treatise brilliantly translated by M. CHAVANNES and M. PELLIOT in collaboration.[2] Compassion is likened there to "the precious pearl called the bright moon which is the first among all jewels" (p. 67). The Messenger of Light is compared with "the perfumed mountain, vast and grand, of all jewels," and with "the precious diamond pillar supporting the multitude of the beings" (p. 90). "Our heart has received the majestic splendor of the pearl granting every wish," it is said at the end of this treatise (p. 92). Such like thoughts may explain the utilization of pearls in the Manichean church of Sze-ch'uan. We know also that the adherents of Mani were fond of flowers, perfumes and ornaments, and in the same book (p. 61), there is even a legend in regard to the origin of jewels which seems to be connected with their beliefs of resurrection. The dying Manichean was adorned with rich ornaments (apparently symbolic of light) to be prepared for admission into the luminous regions. The gods approach the dead with ornaments which have the effect of putting the present devils to flight.[3] It does not seem to be known what symbolism the Manicheans attached to the balas ruby.[4] But as the lost literature of this religion is gradually being rediscovered thanks to the scholarship of F. W. K. Müller, Le Coq, Pelliot and Chavannes, there is hope that the future will reveal this fact, and that also the puzzling word *sê-sê* will occur in the writings of the Manicheans.[1]

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[1] The basis of this symbolism certainly is to be traced to the writings of the New Testament, especially REVELATION XXI, 18–21, and presents the counterpart to the mystic and moralizing ideas associated by mediæval Christian writers with the twelve precious stones in the breastplate of the Jewish High Priest, the twelve jewels forming the foundations of the wall of Heavenly Jerusalem just referred to, and the jewels in the crown of the Virgin. Among the latter, the balas ruby appears in the fifteenth century in the story of the visions of Sainte Françoise where four other stones not figuring among the twelve of the Bible are listed,— the diamond, garnet, carnelian and turquois (L. PANNIER, Les lapidaires français du moyen âge, p. 225, Paris, 1882; see *ibid.*, pp. 280–2, on the mediæval beliefs regarding balas ruby). DANTE (Paradiso IX, 67) extols the lustre of the *balascio*: L'altra letizia, che m'era già nota Preclara cosa, mi si fece in vista Qual fin balascio in che lo sol percota. The ruby, in general, was emblematic of glory, and with predilection, chosen for the rings of the bishops (H. CLIFFORD SMITH, Jewellery, p. 148, New York, 1908, and D. ROCK, Church of our Fathers, Vol. II, p. 171, London, 1849, where a gold pontifical ring with a sapphire surrounded by four balas rubies is mentioned).

[2] Un traité manichéen retrouvé en Chine. Extrait du *Journal asiatique*, Paris, 1912.

[3] G. FLÜGEL, Mani, seine Lehre und seine Schriften, pp. 268, 339 (Leipzig, 1862).

[4] Some of the symbolism associated with the spinel in western Asia may be gleaned from the Armenian *lapidarium* translated into Russian by K. P. PATKANOV (p. 19): "The spinel shares with the ruby in the quality that it quenches thirst, as soon as it is placed in the mouth. When pounded and mixed with a medicinal extract, it gladdens man and removes from him grief and sorrow. Mixed with an unguent and administered to the eyes, it strengthens their vision and renders man far-sighted. Its nature is warm and dry. The sages say that the wearing of a spinel protects one from all diseases, from pain in the loins; it safeguards man from bad dreams and devils. The wearer of a spinel becomes agreeable to people."

I have no definite opinion as to the indigenous *sê-sê* mentioned in the Sung period and in the fanciful stories of the T'ang dynasty. It is evident that neither the spinel nor the turquois is here involved, but that it is the question of some Chinese stone of fine appearance which is beyond the possibility of positive identification, as the accounts are too vague and elastic. It is manifest that *sê-sê* was a favorite word in the age of the T'ang, perhaps owing to its pleasing rhythm, that the far-off countries where the jewel was first discovered lent it a nimbus of romance, and that the name could easily be transferred to other similar stones. If I am allowed to express a personal opinion, I may say that this kind of *sê-sê* possibly refers to onyx. We see from Pseudo-Aristotle's *Lapidarium* [2] that China was known to the Arabs as a place of production for onyx, and it might even be conjectured that the Arabic word for onyx *djaza* (Persian *djiza*) which has penetrated into Sanskrit in the form *çesha* [3] and into Tibetan in the form *zé* [4] may have been instrumental in the shaping of the Chinese word *sê-sê* of this meaning. The existence of onyx in ancient China has not been heretofore recognized, because the indigenous word for it, on traditional convention, was accepted to have the meaning of jade, nobody knowing what kind of jade was understood. This is the compound *pi yü* (Giles's Dictionary, No. 9009) usually translated "greenish or bluish jade." A. FORKE [5] was the first to express his doubts of the correctness of this translation, and to point out that there are Chinese authors who distinguish *pi yü* from jade. Now we find in the English and Chinese

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[1] We could perhaps even go so far as to connect the importation of rubies into China with the Manicheans. According to the Arabic author Qazwīnī (1203–83) there were several kinds of precious stones like rubies and others, and plenty of gold in Sandābil, identical with Kan-chou, the capital of the kingdom of the Tangutans (Chinese *Si-hia*, 1004–1226), and according to him, Manicheans lived there at the same time and enjoyed there perfect liberty (compare J. MARQUART, Osteuropäische und ostasiatische Streifzüge, pp. 87–88, Leipzig, 1903).

[2] JULIUS RUSKA, Das Steinbuch des Aristoteles, p. 145, Heidelberg, 1912. Also Ibn al-Baiṭār, 1197–1248 (L. LECLERC, Traité des simples, Vol. I, p. 354, Paris, 1877), makes the statement that onyx is found in Yemen and in China. Regarding onyx in Persia compare G. P. MERRILL, The Onyx Marbles, pp. 577–9 (*Report of U. S. National Museum*, 1893). See further E. WIEDEMANN, Zur Mineralogie im Islam, pp. 245–9 (Erlangen, 1912).

[3] L. FINOT, Les lapidaires indiens, p. XVII (Paris, 1896).

[4] Mr. ROCKHILL (The Ethnology of Tibet, p. 692) tells us that he has seen in certain portions of Tibet (Miri, near Shobando, for instance) the men wearing necklaces of coral beads and a substance which he believes is onyx, and which is called by them *zé*.

[5] *Mitteilungen des Seminars für Orientalische Sprachen*, Vol. VII, 1904, p. 147.

Standard Dictionary published in 1908 by the Commercial Press of Shanghai (Vol. II, p. 1561) the word onyx translated by this very term *pi yü* [1] (also by *tai wên ma-nao*, "streaky agate"), and I have no doubt that also in ancient texts the word *pi yü* designates the onyx. Thus, for example, in the account of Ta Ts'in given in the *Wei lio* [2] where the five-colored (that is, variegated) *pi*, in my opinion, is onyx; likewise the pillars in the country of Fu-lin, as reported in the *Kiu T'ang shu* (see above p. 27) were of onyx or *sê-sê*. In the older account of the *Wei lio* compiled prior to the year 429 A. D., the Chinese designation is still retained, while in the epoch of the T'ang a preference was manifested for the West-Asiatic name which was then transferred also to the home product. In this manner, a plausible explanation may be found for the occurrence of *sê-sê* on Chinese soil, for the use of this word with reference to the Roman Orient, and particularly for the carvings described in the traditions of the T'ang period and in the archæological works of the Sung dynasty, which could have indeed been made of onyx, a stone material ranking next to jade in Chinese eyes.[3] The difficulty of research in this line is enhanced by our lack of knowledge of the mineralogy of China, so that we are still deprived of a solid scientific foundation for our studies.

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[1] This is likewise the case in the German-Chinese Dictionary published by the Catholic Missionaries of South-Shantung, p. 613 (Yen-chou fu, 1906).

[2] HIRTH, China and the Roman Orient, pp. 73, 113.

[3] There are two references pertaining to Herat and Samarkand in a text of the fifteenth century where the word *sê-sê*, without any doubt, signifies a building-stone. In 1415 Ch'ên Ch'êng returned to China from a journey through Central Asia which had taken him through seventeen different countries. He published the information gathered by him in a book entitled *Shi si yü ki*, "Record of an Embassy to the Western Regions" (compare *Ming shi*, Ch. 332, and BRETSCHNEIDER, *China Review*, Vol. V, 1876, p. 314). The original seems to be lost, but extracts from it are quoted in the Imperial Geography of the Ming Dynasty (*Ta Ming i t'ung chi*, edition of 1461). Under the heading of Herat (*Ho-lie*), Ch'ên Ch'êng is cited as saying (Ch. 89, fol. 23 b): "They are fond of clean clothing which is white in color, and which is exchanged for dark in case of mourning. The windows and walls of the palace in which the ruler of this country lives are adorned with gold, silver, and *sê-sê*." With reference to Samarkand the same author reports (*ibid.*, fol. 22 b): "There are many workmen there skilful in all handicrafts and clever in erecting palaces, buildings, gates, and pillars, with carvings in open work, and with windows connected by *sê-sê*." Both turquois and balas ruby are out of the question in these two cases; it is a building-stone, and most probably the onyx, which is here referred to.—As our knowledge of ancient Chinese sculpture advances, we may hope to obtain several exact definitions for the ancient names of stones, as in many of the votive inscriptions engraved in the monuments the name of the stone is expressly stated (though most frequently only the designation "stone image" is employed). The term *yü shi* (*lit.* jade stone) mentioned by PELLIOT (*T'oung Pao*, 1912, p. 435) is also well known to me as occurring on Buddhist statuary of the Wei and T'ang periods, and it had never been assumed by me that it has the meaning of jade; *yü shi*, as also PELLIOT says, means a jade-like stone, probably only a highly prized or valuable stone. The term *yü Fu* (*lit.* jade Buddha) may have well been employed in the figurative sense of "precious Buddha." The word *sê-sê* I have not yet traced in the inscription of any sculpture, but it is possible that it will turn up some day or other.

The problem as to the precious stones utilized by the T'ang dynasty could very well be solved in the Imperial Treasury (Shōsōin) of Nara, Japan, if an experienced mineralogist might be admitted there to make a close investigation of the numerous precious stones lavished on Chinese objects of that period. In the *Tōyei Shuko* published by the Imperial Household where these treasures are splendidly illustrated, but inadequately described, the importance of this subject is overlooked. We read, for example, on p. 5 of Vol. I of discs used in playing games, 35 of crystal, 35 of amber, 20 of yellow lapis lazuli, 20 of azure lapis lazuli, 15 of slightly green lapis lazuli, 15 of green lapis lazuli; in the description of swords, green lapis lazuli is repeatedly mentioned. Needless to say there is no yellow or green lapis lazuli, and that these definitions rest on guesswork, not on investigation. But the same remark holds good for most of our archæological collections. A competent examination of the intaglios discovered in Turkistan, especially Khotan, and of the engraved gems of the Sassanian period of Persia would likewise yield new results for this interesting branch of research.

At a future date, precious stones will occupy a prominent place also in Chinese archæology, and the practical utility of studies like the present one will then become manifest. Already now the fact is apparent that precious stones are found in Chinese graves, and there is a certain number of them (especially lapis lazuli, carnelian, agate, and others as yet undefined) in the collections of the Field Museum. But for lack of evidence this subject is difficult to treat at present. Turquois, as far as I can judge, and as far as I know from Chinese experts, has not yet been discovered in any Chinese grave. The day will not be far when also Chinese archæology will be based on the actual evidence of the finds, and — *qui vivra verra.*

In regard to Tibet a plausible interpretation may be offered, and the Chinese transcription *sê-sê* referring to a jewel greatly prized by the ancient Tibetans seems to be traceable to a Tibetan word. There is a Tibetan word *zê* (or *zê-ba, ba* being only a suffix), a different word from the one mentioned before, which in the Tibetan-Sanskrit dictionaries is translated by Sanskrit *açmagarbha*; the latter is, according to the *Rājanighaṇṭu* (ed. GARBE, p. 77), an epithet of the emerald, and Tibetan *zê* (= Chinese *sê-sê*) would accordingly designate the emerald.[1] This identification is quite in keeping with what Chinese authors report regarding the high value of *sê-sê* in Tibet. Also the Tibetan word *mar-gad*, derived from Sanskrit *marakata*, sufficiently shows that the Tibetans were acquainted with the emerald. Capt. A. Gerard, speaking of the people of Spiti in the extreme western part of Tibet, remarks that they have beads of coral and other precious stones which resemble rubies, *emeralds* and topazes.[1] The surface of a mausoleum in Yamdo Samding is studded over with large turquoises, coral beads, rubies, *emeralds* and pearls.[2] Samuel Turner,[3] in "a list of the usual articles of commerce between Tibet and the surrounding countries," has registered emeralds exported from Bengal to Tibet.

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[1] Compare the Chinese word *she-she*, "emerald," cited by PALLADIUS (see above p. 25, note 1). It is noteworthy that the Chinese accounts of *sê-sê*, in a measure, present a curious analogy with the notices of the emerald on the part of the ancients, in that the latter have mingled with the genuine emerald other statements which cannot relate to the latter, for example, fabulous reports on Egyptian emeralds four cubits long and three cubits wide, and on obelisks of emerald (H. BLÜMNER, *l. c.*, Vol. III, p. 239, and LESSING, Briefe antiquarischen Inhalts, XXV).

Abel-Rémusat[4] has wrongly ascribed the meaning of emerald to the word *lü-sung shi*, meaning "turquois"; on the other hand he erroneously translates by "chrysolith, or perhaps turquois" the Chinese word *tsie-mu-lu*, corresponding to Manchu *niowarimbu wehe* (that is, greenish stone), which is the emerald. This is proved by the Imperial Dictionary in Four Languages, where this Chinese and Manchu term corresponds to Tibetan *mar-gad* (written also *ma-rgad*, Tāranātha 173, 19) and Mongol *markat*, both derived from Sanskrit *marakata* which itself is a loan word from Greek *zmaragdos* or *maragdos*.[5] The Chinese word

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[1] See Rockhill, The Ethnology of Tibet, p. 694.

[2] S. Chandra Das, Journey to Lhasa, p. 183 (London, 1904).

[3] An Account of an Embassy to the Court of the Teshoo Lama, in Tibet, p. 383 (London, 1800). On p. 261 he tells that he saw the rosaries owned by the deceased Pan ch'en rin-po-ch'e, made of pearls, emeralds, rubies, and sapphires; and on p. 336, he describes the necklace in the possession of a Lhasa lady of high rank, in which were employed balas rubies, lapis lazuli, amber, and coral in numerous wreaths, and in her hair she wore pearls, rubies, emeralds, and coral.

[4] Histoire de la ville de Khotan, p. 168 (Paris, 1820).

[5] A. Weber, Die Griechen in Indien (*Sitzungsberichte der Berliner Akademie*, 1890, p. 912). The oldest reference given in the Petersburg Sanskrit Dictionary as to the occurrence of the word *marakata* is the *Rājanighaṇṭu*. It is found, however, in the Sanskrit romances, for example, in the *Vāsavadattā* (edition and translation of L. H. Gray, p. 109, *Col. Un. Indo-Iranian Series*, Vol. VIII, New York, 1913) of the seventh century. Also the Tibetan derivate *mar-gad*, appearing as equivalent of *marakata* in the Sanskrit Buddhist dictionary Mahāvyutpatti (ed. of Minayev and Mironov, p. 77, St. Petersburg, 1911), allows us to infer that the Sanskrit word is older than the seventh century. It occurs likewise in Buddhabhaṭṭa (L. Finot, Les lapidaires indiens, p. XLIV) who probably wrote before the sixth century A. D. For the first part of the sixth century we have the testimony of Cosmas Indicopleustes (J. W. McCrindle, Ancient India as described in Classical Literature, p. 164, Westminster, 1901) who states that the White Huns living farther north than India highly prize the emerald, and wear it when set in a crown, for the Ethiopians, who traffic with the Blemmyes in Ethiopia, carry this same stone into India, and with the price they obtain make purchases of the most beautiful articles. The tradition of the *Agastimata*, as pointed out by Finot (p. XLIV), seems to allude likewise to Egypt as to the derivation of the emerald. The Egyptian emerald has been studied by O. Schneider and A. Arzruni (*Zeitschrift für Ethnologie*, Vol. XXIV, 1892, pp. 41–100). The Greeks seem to have obtained their emeralds from Egypt; the Greek word is connected with Semitic *baraqt* or *bāreqet* (Daremberg and Saglio, Vol. II, p. 1467, and O. Schrader, Reallexikon, p. 153), but possibly also with Egyptian *mafek-ma* or *mafek-en-mā* (R. Lepsius, Les métaux dans les inscriptions égyptiennes, p. 43, Paris, 1877). The reports of the Arabic geographers on the Egyptian emerald-mines are translated by Wiedemann (Zur Mineralogie im Islam, p. 239, Erlangen, 1912).

tsie-mu-lu seems to go back directly to the Persian word *zumurrud*,[1] and it seems quite plausible that the Chinese obtained emeralds in their considerable trade with Persia. Possibly the Chinese have made their first acquaintance with emeralds at the end of the Mongol period.[2]

Let us now revert to the history of the turquois in China. T'ao Tsung-i, the author of the interesting work *Cho keng lu* (first published in 1366) replete with valuable information concerning the Mongol period, has embodied in it a brief enumeration of the precious stones of the Mohammedans, which were traded to China in his time (Ch. 7, pp. 5 b–7 b, edition of 1469). The last group of these stones is designated *tien-tse* (Giles's Dictionary, No. 11,180, but not noted with this meaning).[3] Three kinds of these are distinguished: first, *Ni-she-pu-ti*, that is, stones from Nīshāpūr in Persia, called the Mohammedan *tien-tse* whose veins are fine; secondly, *Ki-li-ma-ni*, that is, stones from Kermān in Persia, called *Ho-si tien-tse* (that is, *tien-tse* used in the country of the Tangutans) whose veins are coarse; thirdly, stones of King-chou, called *tien-tse* of Siang-yang whose color is changeable. It is easy to see, and BRETSCHNEIDER [1] has already pointed it out, that the turquois of Nīshāpūr and Kermān is understood here,[2] and it hence follows that *Siang-yang tien-tse* must have the meaning "turquois of Siang-yang." Siang-yang is a city and prefecture of Hu-pei Province, and King-chou is the name of an ancient province comprising parts of the present provinces of Hu-nan and Hu-pei. The changing of color, indeed, fits the turquois, since its blue shades often fade to a pale green on long exposure to the light.[3] If this conclusion is correct, this would be the oldest Chinese reference to a turquois-producing locality in China proper in the latter part of the fourteenth century, and the first authentic use of a word for turquois in the Chinese language.[4] It is interesting that Tu Wan in his *lapidarium* of 1133 (Ch. A, p. 11; see p. 23) devotes a notice to stones of Siang-yang employed for building purposes, but has no allusion to turquois of this or any other locality. It is therefore obvious that, while quarries existed in that place during the Sung period, the turquois had then not yet made its appearance, and the fact is confirmed that the turquois mines were not operated before the Mongol period. It is noteworthy, as we shall see hereafter, that at present turquoises are still mined in Hu-pei. If we now recall the account of Marco Polo (p. 16), it seems we are justified in saying that the Chinese became acquainted with the turquois not earlier than in the Yüan or Mongol period, that is to say, the thirteenth and fourteenth centuries. This early mining in Hu-pei cannot have been of great importance, as it is not alluded to in later sources. We further observe that the Persian turquois became known to the Chinese in the fourteenth century, and was considered as superior to the domestic stone.[1]

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[1] Horn, Neupersische Schriftsprache, p. 6 (*Grundriss der iranischen Philologie* I, 2) and F. Justi, Kurdische Grammatik, p. XVI (St. Petersburg, 1880). In the Taoist novel *Fêng shên yen i* emeralds are mentioned as composing the umbrella of Virūpāksha. In W. Grube's posthumous work (Metamorphosen der Götter, p. 512, Leiden, 1912) the name *tsu-mu-lu* has not been recognized as a foreign word and is literally translated from the meaning of the Chinese characters "Grandmother green," while the editor H. Mueller in the index compiled by him (p. 651) explains it as "pearls"; also the variant *tsu-mu-pi* there employed means "emeralds." The same manner of writing the word (*tsu-mu-lu*) is employed also by Yang Shên (*Ko chi king yüan*, Ch. 33, p. 1) and by Ku Ying-t'ai in his *Po wu yao lan* (*ibid.*) written between 1621 and 1627. A curious error occurs in R. Pumpelly, Geological Researches, p. 118 (*Smithsonian Contributions to Knowledge*, Vol. XV, Washington, 1867) who in a discussion of the mineral production of Yün-nan remarks: "Emeralds are very rare, and although the Chinese name is lieupaoshī [*i. e. lü pao shi*] (green precious stone), they are known among lapidaries as Sz'mulu, the name of Sumatra, whence they are probably obtained." The Chinese word in question is not a designation of Sumatra which was known to the Chinese under the names Shi-li-fo-shi and San-fo-ts'i (see Hirth and Rockhill, Chau Ju-kua, p. 63), nor is emerald known to be found on Sumatra.

[2] Bretschneider, Mediæval Researches, Vol. I, p. 174. But at an earlier date they heard of emeralds in the translations of Buddhist Sanskrit works. In one of the series of the so-called Seven Jewels (*saptaratna*) the emerald appears in the second place following the diamond, and is transcribed in the form *mo-lo-kia-t'o* rendered into Chinese "green-colored bead" (*lü sê chu*) identical with *harinmaṇi*, one of the Sanskrit synonyms of the emerald. Compare *Kiao ch'êng fa shu* (Ch. 7, p. 3, Hang-chou, 1878), a Buddhist dictionary of numerical categories written by Yüan Tsing in 1431 (Wylie, Notes, p. 211).

[3] In fact, none of our dictionaries contains the word *tien-tse* with the meaning of turquois, nor even does K'ang-hi's Dictionary. The origin and significance of the word is somewhat embarrassing, as it cannot be explained from any meaning assigned to the character *tien* (No. 11,180). In my opinion, a confusion of characters has been in operation in writing the word. It was intended for the character *tien* (No. 11,179) whose meaning is "to inlay objects with stones, inlaid or incrustated work." From this verbal noun, the new word *tien-tse* was derived with the sense "stones for inlaying," one of the main purposes for which turquoises are employed, and hence quite an appropriate designation. In the Ming period (*Ko ku yao lun* and *Pên ts'ao kang mu*, see below) we find a new mode of writing the word *tien-tse*, with the character *tien* (No. 11,199) meaning "indigo," which might have been prompted by an association of the color of the stone with that of indigo.

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[1] Mediæval Researches, Vol. I, p. 175.

[2] See above pp. 40-42.

[3] This peculiar property of the turquois is well known. Ibn al-Baiṭār says after al-Kindī who (according to WIEDEMANN, Zur Alchemie bei den Arabern, *Journal für praktische Chemie*, 1907, p. 73) died shortly after 870 A. D., that "the turquois changes its color on contact with an oily substance; also perspiration affects it [this is mentioned likewise by BOETIUS DE BOOT, *l. c.*, p. 269 and MAX BAUER, Edelsteinkunde, p. 488] and entirely deprives it of its color; contact with musk has a similar effect and destroys its value; Aristotle holds the opinion that a stone thus changing color has no value for its wearer" (L. LECLERC, *l. c.*, Vol. III, p. 51). In Pseudo-Aristotle (J. RUSKA, *l. c.*, p. 152) the purity of color in the stone is ascribed to the purity of the atmosphere which, when the latter becomes impure, causes the stone to become dim; when it comes in contact with molten gold, its beauty disappears. The latter clause is dubious. The sentence imputed to Aristotle is not traceable to him; neither Aristotle nor Theophrast make mention of the turquois. The alteration of color gave rise to the belief in the west that the stone foretold misfortune, or that the stone, when its owner sickens, will grow pale, and at his death lose color entirely. BEN JONSON (1574–1637), the dramatist, in his *Sejanus*, has the verse: "And true as Turkise in the deare lord's ring, Looke well or ill with him." FENTON (Secret Wonders of Nature, 1569) says: "The Turkeys doth move when there is any perill prepared to him that weareth it."

[4] The quarrying of turquois in Hui-ch'uan, Yün-nan Province, mentioned for the year 1290 in the *Yüan shi* (see p. 26, Note 3) is, of course, older in fact. The *Cho keng lu*, however, is our starting-point in unraveling the mystery, as it affords the means of determining in an unobjectionable manner the significance of the word *tien-tse*. With this authentic evidence in our hands we can hope to attack successfully the passages in the *Yüan shi* where this word is employed, while it is not there explained. Besides, we have the important testimony of MARCO POLO, as pointed out before, which enables us to establish with certainty the fact that turquois was known and mined in China during the Mongol period. Marco Polo was familiar with the turquois, as shown by his remarks on the turquois-quarries in the province of Kermān in Persia, so that his turquois in the province of Caindu cannot be called into doubt.

This identification enables us to recognize the turquois also in the *Yüan shi*, the Chinese Annals of the Mongol Dynasty, where it is called *pi tien*, or *pi tien-tse*, "green or blue *tien*" (the word *tien* being identical with the above-mentioned word of the *Cho keng lu*). It entered the robe of the emperor and courtiers, and gold beads and turquoises are especially mentioned as used for earrings (*Yüan shi*, Ch. 78, p. 13 b). The Mongols were doubtless acquainted with the turquois long before their occupation of China, either through the Tibetans or Turkish tribes or through both. We know that among the antiquities of the bronze age of Siberia gold plaques incrusted with turquois and emeralds have been found[2] and, aside from Egypt, this ancient Siberian technique possibly represents the oldest employment of the turquois in the world. To the Chinese it was an alien substance which never became a national factor in their jewelry. They made its acquaintance through Turks, Persians, Tibetans, and Mongols, and I am under the impression that the Mongol rulers were the first to introduce it into China, and that their utilization of the stone gave impetus to the discovery of turquois mines on Chinese soil, and led to the turquois monopoly related by Marco Polo which has been mentioned above (p. 16) in the notes on Tibet. Also the reports of turquoises sent from the circuit of Hui-ch'uan in Yün-nan Province in the years 1284 and 1290 related in the *Yüan shi* (compare above p. 26, note 3) may be set in causal connection with the craving of the Mongol sovereigns for this stone.

At the rise of the Yüan Dynasty, the rule was established that products like gold, silver, pearls, jade, copper, iron, mercury, cinnabar, and turquoises offered to the throne by the inhabitants of the regions where the said products were found should be charged to the annual taxes due to them.[1] The localities for the production of turquoises, on this occasion, are given as Ho-lin and Hui-ch'uan. The former place is mentioned again under the Mongols in the year 1271 to the effect that a certain Umala collected turquoises (*pi tien-tse*) at Ho-lin.[2]

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[1] At this point we should stop to reflect again whether, after all, the mining of turquois in Persia on an extensive scale is not earlier than the Mohammedan period. Compare above p. 40.

[2] KONDAKOFF, TOLSTOI and REINACH, Antiquités de la Russie méridionale, pp. 404, 405; S. REINACH, La représentation du galop dans l'art ancien et moderne, p. 66 (Paris, 1901). As far as I know, these turquoises have never been examined by a competent mineralogist, nor have they been traced to their place of origin. BAUER has nothing to say concerning the occurrence of turquois in Siberia. The Armenian *lapidarium* of the seventeenth century (translated by K. P. PATKANOV, *l. c.*, p. 48) gives Siberia as the fourth source for the turquois, and adds that this kind does not command any price.

Ho-lin is the Chinese designation for Karakorum,[3] the famous residence of the first successors to Chinggis Khan, Ogotai, Kuyuk and Mangu, and a large industrial and commercial centre in the Mongol period. It is not known whether turquoises occurred or are now found in the environments of that ancient capital, that is, in the basin of the Orkhon river, and it may very well be that Karakorum, during the thirteenth century, was merely a staple-place for them, whence they were traded to the Mongol and Tungusian tribes. In *Yüan-shi* (Ch. 94, § 2, p. 1) turquoises are enumerated among the natural products of the empire together with gold, silver, pearls, jade, copper, iron, mercury, vermilion, lead, tin, alum, saltpetre, and carbonate of natron.

It is thus evident that in the Mongol period at least three turquois-mines were in operation, in Hu-pei, Yün-nan, and Sze-ch'uan (Marco Polo's Caindu).

Also from Tibet turquoises were imported into China during that period. This may be inferred from a remark of Ts'ao Chao who published in 1387 the *Ko ku yao lun*, a collection of notes on art and antiquities. This was in the beginning of the Ming dynasty which rose in 1368, so that the author must have lived through the last years of the Yüan. He avails himself for the turquois of the peculiar Yüan expression *pi tien-tse*, but using a different character to write *tien*, identical with the word for 'indigo' (No. 11,199), so that the name would mean 'blue indigo sons.' He gives as localities for these stones the regions of the southern and western Tibetans (*Nan-fan*, *Si-fan*[4]) and describes them as of blue and green color, adding that good ones come somewhat near to the price of a horse, a statement evidently copied from the *Wu Tai shi* in regard to the *sê-sê* of the Tibetan women, referred to above.[5] He further says that they are of the class of beads, and that there are also those of black and green hues which are low in price. In another work of the Ming period, the *Po wu yao lan* (published between 1621 and 1627), the precious stones of Tibet are enumerated, the series being closed by a "blue precious stone, light-blue in color like the hue of the sky." As the word *pao shi*, 'precious stone' is used here, I am not certain whether the turquois is meant.

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[1] *Kin-t'ing se wên hien t'ung k'ao*, Ch. 23, p. 3.

[2] *Ibid.*, p. 6 b. Hui-chou, as written in this work, is a mistake for Hui-ch'uan, as proved by the parallel passage in *Yüan shi*, Ch. 94, §2, pp. 1 b, 2 a.

[3] BRETSCHNEIDER, Mediæval Researches, Vol. I, p. 122; Vol. II, p. 162.

[4] From our standpoint eastern Tibetans; they border on the west of China and live partially on territory belonging to the political administration of China.

[5] For the rest, this is merely phraseology which cannot be taken very seriously. In China as elsewhere stock-phrases are formed in the way of literary allusions and *bons mots* for stylistic purposes, and it would be preposterous to see in these a foundation of real fact. Thus the phrase, "bead or pearl of the value of a horse," is one of the

In Chinese pottery occurs a deep-blue glaze well known to collectors under the name of turquois glaze. It has sometimes been supposed that this glaze was intended to imitate the color of turquois, as is, *e. g.*, stated in the "Catalogue of the Morgan Collection of Chinese Porcelains."[1] This view, however, is erroneous; "turquois glaze" is merely a designation of foreign origin, whereas, in the minds of the Chinese, the glaze has no relation to the turquois. This glaze is produced by means of a silicate of copper known to the Chinese as *fei ts'ui* from its resemblance to the color of the plumes of the kingfisher, or as *k'ung-tsio lü*, "peacock green."[2] This glaze appears for the first time in the pottery of the Sung period (960–1279)[3] and was in full swing during the time of the Ming dynasty, being applied to porcelain as successfully as to faience. During these two periods, the turquois was hardly known to the Chinese, or played no rôle in their life.[4]

The modern word *lü sung shi*, as far as I can see, does not occur earlier than the eighteenth century,[5] and it may be presumed also that

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school reminiscences reiterated by several authors. As early as in the *Lapidarium* of Tu Wan (*Yün lin shi p'u*, published in 1133) we find it stated (Ch. 2, p. 7) that on the waste land of the Temple of the White Horse (*Pai ma sze*) east of Ho-nan fu, after a heavy rain, fine stones of a deep purple and green color are found in the ground which belong "to the class of beads having the price of a Tibetan horse; others of these beads are light-green with many veins and speckles, and some are made into carvings of objects and images; deep-green ones are high in price." "These stones," concludes the author, "are produced in foreign countries, and are found also in the soil near the ancient capitals of Si-ngan fu and Lo-yang (Ho-nan)." If it were permissible to regard these stones as imported turquoises, additional negative evidence would be furnished that turquois was not yet mined in China during the Sung period. Also Li Shi-chên (in his *Pên ts'ao kang mu*, Ch. 8, p. 17 b) uses the term 'bead of the value of a horse' (*ma kia chu*) as a designation for kingfisher-blue stones.

[1] Vol. II, p. 78 (New York, 1911).

[2] Compare S. W. BUSHELL, Oriental Ceramic Art, pp. 265, 315, 376 (New York, 1899).

[3] LAUFER, Chinese Pottery, p. 316.

[4] There is a popular tradition in Tibet in regard to blue-glazed Chinese faience tiles with which some temples are roofed that the first king Srong-btsan sgam-po of the seventh century had produced the glaze by melting an immense quantity of turquois for the purpose (S. CHANDRA DAS, Narrative of a Journey round Lake Yamdo, p. 49, Calcutta, 1887).

[5] It is certainly possible, as in the case of the word *pi-ya-se*, that also the word *lü sung shi* belonging to the colloquial language may be of earlier date than we at present suspect; but as the older sources regarding the every day language are very scarce, we can not yet offer any positive evidence.

the exploitation of turquois mines in China was taken up again only at that time, while it was interrupted during the Ming period. In the records of the Ming and Ts'ing dynasties, there is no reference to quarrying turquois. The great work on natural history of the sixteenth century, the *Pên ts'ao kang mu*, has nothing to say regarding this matter. In the K'ien-lung period (1736–95) turquois was occasionally used in the imperial manufacture at Peking, as we may ascertain from several specimens in the Bishop collection in the Metropolitan Museum of New York. It contains, for instance, a scabbard of chiseled repoussé gold decorated with the eight Buddhist emblems (*pa pao*) carved in turquois, apparently intended as a gift for some Mongol prince, and an imperial knife marked with *K'ien-lung*'s seal, the handle being studded with lapis lazuli, carnelian and turquois.[1]

It appears that the Manchu emperors with their predilection for Lamaism and their interests in the Mongols and Tibetans derived the application of turquois from these peoples, and followed in this respect the trail of the Mongol emperors. Among the Chinese these stones never became popular.[2] They were occasionally employed for inlaying, but then in connection with other stones to produce certain color effects. BUSHELL [3] figures a box of carved red lacquer, decorated with floral designs, the fruit, flowers and other details inlaid in green and yellow jade, lapis lazuli, turquois and amethystine quartz. In the Chinese collection in the Field Museum there is a pair of jade trees in pots of cloisonné enamel, the leaves of which are beautifully carved out of turquois.[4]

It was for the first time also in the K'ien-lung period that the stone was officially adopted and its use sanctioned for the imperial cult.

Turquoises enter the imperial robe on some occasions, as recorded in the "Institutes of the Manchu Dynasty" (*Ta Ts'ing hui tien t'u*, Ch. 42). When the emperor officiates in the Temple of Heaven (*T'ien t'an*), he wears a rosary of lapis lazuli beads; in the Temple of Earth (*Ti t'an*), one of amber beads, yellow being the color of Earth; in the Temple of the Sun (*Ji t'an*), one of corals; and in the Temple of the Moon (*Yüe t'an*) one of turquoises (*lü sung shi*); while the girdle for the service in the latter temple is set with white jade.[1] The ordinary imperial court-girdle consists of yellow silk and is adorned with rubies or sapphires and turquoises. Also in the State Handbook of the Manchu Dynasty (*Huang ch'ao li k'i t'u shi*) turquoises are repeatedly mentioned as entering imperial helmets and sword-sheaths, also as employed for the jewelry of the empress and the court-ladies. They usually were combined with river pearls, corals, and lapis lazuli.[2]

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[1] See BISHOP, Investigations and Studies in Jade, Vol. II, p. 244.

[2] This lack of popularity is best evidenced by the fact that the turquois does not appear in the Chinese materia medica as it does in India and Tibet, nor are there any superstitious beliefs regarding it. This is remarkable considering among the Chinese the widest utilization for medicinal purposes of all substances occurring in the three kingdoms of nature.

[3] Chinese Art, Vol. I, p. 133.

[4] Figured in Jade, Plates LXVI and LXVII. The model of the Chinese jade trees presumably is to be looked for in the Bodhi trees of India made from precious stones and metals. The Great Chronicle of Ceylon (W. GEIGER, The Mahāvaṃsa, p. 203, London, 1912) from about the sixth century A. D. has this report: "In the midst of the relic-chamber the king placed a Bodhi tree made of jewels, splendid in every way. It had a stem eighteen cubits high and five branches; the root, made of coral, rested on sapphire. The stem made of perfectly pure silver was adorned with leaves made of gems, had withered leaves and fruits of gold and young shoots made of coral. The eight auspicious figures [these are, lion, bull, elephant, water-pitcher, fan, standard, conch-shell, lamp] were on the stem and festoons of flowers and beautiful rows of four-footed beasts and rows of geese." Then follows a description of the canopy consisting of pearls and precious stones.

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[1] Color symbolism is an ancient and conspicuous feature of Chinese rites, and was originally associated with the four quarters and the cosmic deities who were linked with the latter (compare Jade, p. 120); at a later time it was affiliated also with the five elements and other categories of five (a comparative table of these associations is given by A. FORKE, Lun-hêng, Vol. II, p. 440). The Chinese system has already been compared with those found in North America and Mexico by Mrs. ZELIA NUTTALL, The Fundamental Principles of Old and New World Civilizations (*Arch. and Ethn. Papers, Peabody Museum*, Vol. II, Cambridge, Mass., 1901, pp. 286, 293), with the result that, "whilst the fundamental principle of the system was identical, the mode of carrying it out was different in China and America, a fact which indicates independence and isolation at the period when elements and colors, etc., were chosen and assigned to the directions in space." The whole problem, of course, is not historical but purely psychological.—In the imperial worship of the Manchu dynasty, as shown above, color symbolism was still fully alive. In the Temple of Heaven covered with blue-glazed faience tiles, everything was blue during the ceremonies, the sacrificial utensils being of blue porcelain, the participants in the rites being robed in blue brocades, and Venetian shades made of thin rods of blue glass were hung over the windows, in order to lend also to the atmosphere a tinge of blue. At the Temple of Earth, all was yellow; at the Temple of the Sun, red; and at the Temple of the Moon, everything was brilliant with a moonlight white.

[2] In the Sungari River, a light-green stone of unctuous appearance is found which is utilized for the making of ink-slabs. It is called in Chinese *sung hua yü, lit.*, pine-tree flower jade, but it has nothing to do with turquois nor with jade. The Manchu name Sungari means in the Manchu language the Milky Way, and is popularly called in Chinese, with reference to the Manchu sounds, *Sung hua kiang*, "Pine-tree Flower River," while the designations of the Chinese written language are Hun-t'ung Kiang or Hei Shui ("Black Water"). The meaning of the stone *sung hua yü*, accordingly, is "precious stone of the Sungari River." Compare *Man-chou yüan liu k'ao*, Ch. 19, pp. 1–2 (a work on the History of the Manchu published in 1777). When the records of the Manchu dynasty mention turquois in combination with pearls, this is not a contradiction to what has been stated above regarding this point (p. 31). The pearls of the imperial house were cheap river pearls known as eastern pearls (*tung chu*), a product of Manchuria. They were fished in the Sungari and its side-rivers, and are described as brilliant-white nearly half an inch (Chinese) big, even the smallest of the size of the seed of a soy-bean. They were chiefly utilized on the crowns of the caps of royal princes, their number marking differences of rank (*Man-chou yüan liu k'ao*, Ch. 19, p. 1). The shell yielding this pearl has been identified with *Anodonta plicata Sol.* (compare GRUM-GRZHIMAILO, Description of the Amur Province, in Russian, p. 358, St. Petersburg, 1894, where some information regarding the pearl industry of the Amur region is given).—The word for lapis lazuli in the State Handbook is *ts'ing kin shi* (see p. 44). Beads made from this stone were chiefly employed for ornaments of the empress and court-ladies, likewise for the adornment of ceremonial head-dresses.

At the present time there are two distributing centers in China for the trade in turquoises,— Peking commanding the market of Mongolia, and Si-ngan fu controlling the trade with Tibet. In Si-ngan fu there may be a dozen traders engaged in the business. They are all settled in the same street and work up the raw material in their own shops. They produce beads and flat stones (Plate VI, Fig. 1) in any desired dimensions, by grinding and polishing, and drill perforations through them. The latter is an essential operation as Tibetans are averse to accept any others (except the small beads to be set in rings or the plaques for inlaying earrings and charm boxes). The first experiment that a Tibetan will make with a turquois offered is to ascertain the quality of the perforation by blowing or spitting through it, or by boring it with a needle. If the experiment is unsuccessful, he will return it at once. At Si-ngan the stones are sold by weight, prices ranging according to quality from 5–8 Taels (about $3.50 to $5.60) a catty (1⅓ pounds). Exceptionally beautiful stones or very small and carefully polished beads are sold as individual items only. Beads and stones are purchased there by Chinese commercial travelers trading with Tibetans and employed by them as a means of barter. Their example was duly adopted, and a great many specimens were secured by me in Tibet in exchange for turquoises.

Of worked articles of the Chinese the quadrangular, flat stones (Plate VI, Fig. 1) and the large beads for use in rosaries come first. Then there are fanciful carvings formed into the appearance of rocks (Plate VI, Figs. 2–4) or birds (Plate VII, Fig. 1) destined to adorn the table of a Lama and to serve as paper-weights; further, figures of animals like that of a tiger or a fish to be suspended as ornaments from a girdle (Plate VII, Figs. 3 and 4); snuff bottles (Fig. 2) skilfully hollowed out, and buttons (Fig. 5) with double edge cut into the petals of a flower to be sewed on to a cap, or a fillet worn by women. The image of carved turquois on Plate VII, Fig. 6, represents the Dhyānibuddha Amitābha, made in Peking. The twelve animals of the solar zodiac (Plate VIII) constituting a cycle of twelve years, each year being named for one animal, are each carved from turquois, of Peking workmanship; they represent rat, ox, tiger, hare, dragon, serpent, horse, sheep, monkey, cock, dog, pig or boar. Such sets are made for wealthy Mongols to facilitate the counting of years.[1]

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[1] The carving of such sets is not a modern idea. It was practised as early as the T'ang period when marble was listed for this purpose. A complete set of the animals does not seem to have survived from that epoch, at least none has come to my notice; but a certain number of single animals belonging to different sets, obtained by me in Si-ngan fu, is in the collections of the Field Museum. A curious set carved from nephrite is in the Bishop collection in New York (see BISHOP, Investigations and Studies in Jade, Vol. II, p. 241, No. 730); the representatives of the zodiac have hu-

The Hon. W. W. Rockhill,[1] who passed through Si-ngan in 1889, was given the information that turquois is found in Ho-nan. There is no reason to doubt the correctness of this statement for the mere reason that it was not confirmed to me in 1909; for even in China considerable changes are bound to come about within a period of twenty years, and I am inclined to think that it is quite possible that the mines of Ho-nan have since been exhausted.

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man bodies but animal heads, they are clothed in costume of Chinese style and hold objects as attributes in their hands. This iconographic composition is also traceable to the T‘ang period, as may be evidenced by a tombstone in the collections of the Field Museum; this contains an epitaph (*mu chi*) yielding the date 861 A. D. The twelve animals of the cycle are here arranged in four groups corresponding to the four cardinal points, a group of three facing one of the sides of the quadrangular stone slab, in the same manner as in the one published by M. Chavannes (*T‘oung Pao*, 1909, p. 74) from a Chinese rubbing. While, however, the illustration of M. Chavannes shows figures of men, that is, Chinese officials in official costume, holding in their arms the respective animal, there are engraved on our tombstone figures of men with human bodies clad in official robes and holding jade insignia of rank in their hands, but each having the head of the particular animal. This is the same principle as in the set of the Bishop collection in which each piece is an independent all-round carving. In the rubbing of M. Chavannes the idea is brought out of the officials presiding over the twelve animals, whilst in the two other series the animals are themselves conceived as officials. The same ideas are expressed in the iconography of the gods of the Twenty-eight Lunar Mansions, which will shortly give me occasion for some remarks with reference to a group of masks in our collection representing this series of deities. It is known that the origin and diffusion of this solar zodiac based on a division into twelve parts of the celestial or ecliptic equator has given rise to many discussions and theories. I was formerly inclined (*T‘oung Pao*, 1907, p. 400, and 1909, p. 71) to accept the theory of Chavannes (*ibid.*, 1906, pp. 51–122) according to which the cycle of the twelve animals would have originated among Turkish tribes who transmitted it to the Chinese. Having meanwhile studied the work of Franz Boll, "Sphæra" (Leipzig, 1903), and the same author's recent paper, Der ostasiatische Tierzyklus im Hellenismus (*T‘oung Pao*, 1912, pp. 699–718), I hold that his arguments in favor of an origin of the cycle within the sphere of Egyptian Hellenism are, in general, convincing to a certain extent, though much would remain to be done in detail to prove the migration of the system from this centre to the Turks and to China. There is, however, an objection to be made to the first piece of evidence offered by Boll on behalf of the dependence of the Chinese cycle (p. 705): "In the Chinese list sacred Egyptian animals have survived, particularly the monkey which does not occur on the cold plateau of Central Asia." This is merely an old European fable which seems to be inexterminable, and which has already been refuted by me in *T‘oung Pao*, 1901, p. 28; it would mean to shoot sparrows with cannon to march up here the whole evidence known to every zoölogist, to the effect that monkeys are propagated from the Himalaya through Tibet into the mountains of Yün-nan, Sze-ch‘uan and Kukunōr region, and throughout central and southern China. Chinese, Tibetan, and all other Indo-Chinese languages possess ancient indigenous words for several species of monkeys, and at the time when the cycle was received by the Chinese, the monkey was very familiar to them and frequently represented in art. Another more serious objection to be advanced to the essay of Boll is that he has paid no attention to the arguments which induced L. de Saussure (*T‘oung Pao*, 1910, pp. 583–648) and A. Forke (Lun-hêng, Vol. II, pp. 479–494; compare also the additional remarks of P. Pelliot, *Journal asiatique*, 1912, *Juillet-Août*, p. 163) to defend the indigenous origin of the cycle in China. The Chinese tradition entirely unheeded by Boll can not be so easily run down, and though he has stated the case clearly on its historical side, there remains to be solved the psychological part of the problem which has not yet been touched upon.

[1] The Land of the Lamas, p. 24 (London, 1891).

BRETSCHNEIDER[1] quotes PUMPELLY (Geological Researches in China, Mongolia, Japan, p. 118) as mentioning the existence of *sung ur shi*, a mineral similar to turquois, in the province of Yün-nan; but this statement requires confirmation, as it is not found in other sources relating to Yün-nan (compare above p. 26, note 3).[2]

From one of the turquois dealers in Si-ngan fu the information was given me that the turquoises traded there come from the prefecture of Yün-yang in Hu-pei Province, while another more especially pointed to the district of Chu-shan, situated in the same prefecture, as the place of production. The Imperial Geography (*Ta Ts'ing i t'ung chi*, Ch. 272),[3] in the chapter dealing with Yün-yang fu, contains no allusion to this fact, and mentions in an enumeration of the mountains of the Chu-shan district only one producing stones, the *Fan shi shan*, deriving its name from the *fan shi* or alum formerly produced there. It should be borne in mind that the Imperial Geography, as far as products are involved, does not reflect the present conditions of China based on actual research, but merely gives occasional quotations from older literature going back as far as the T'ang dynasty, so that this feature of the Geography is very incomplete and unsatisfactory. The products of Yün-yang fu, for instance, are all cited from the Geography of the Ming Dynasty (*Ta Ming i t'ung chi*). It is very probable that the turquois production of Yün-yang fu is of recent date, and presumably posterior to the publication of the Geography; it seems to me that the exhaustion of the turquois mines in Ho-nan may have given the impetus to a search for a new locality in Hu-pei. It would be gratifying if these lines would cause a mineralogist or geologist to pay a visit to those Chinese turquois mines, and to give us information on their extent, the working methods employed, and the magnitude of the output and trade in the material.

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[1] Mediæval Researches, Vol. I, p. 176.

[2] The work of R. PUMPELLY is published in *Smithsonian Contributions to Knowledge*, Vol. XV, Article IV, Washington, 1867. I do not understand Pumpelly with Bretschneider as saying that "a mineral similar to turquois" is actually found in Yün-nan. Pumpelly enumerates it in a series of eight other stones of which he says that "they are carved, with great labor and patience, in very intricate forms." He does not point out any locality in Yün-nan, where turquois is obtained, but merely intends to say that he has seen in Yün-nan carvings made from this material which, judging from the Chinese name given by him, doubtless was turquois. But this turquois may have been imported into Yün-nan as well. G. SOULIÉ (La province du Yün-nan, p. 24, Hanoi, 1908) only states: "The south-western part of the province furnishes a certain quantity of precious stones amassed in the beds of torrents or rivers; the west and south-west of the province are renowned for their amethysts, sapphires and rubies."

[3] First printed in 1745, second edition 1764. The modern Shanghai photolithographic reprint is a poor production. The Palace editions of this work are now exceedingly scarce. When at Si-ngan fu in 1902, an official there informed me that the late Empress Dowager, while living as an exile in that city in 1900, was anxious to obtain a copy for personal reading and wired to all Governors General making a requisition for it, but was unable to procure it. Eight years later fate treated me more kindly than the Empress by permitting me to see the *editio princeps* in the hands of a Peking bookseller, but lack of cash (the price demanded was 400 Mexican Dollars) unfortunately barred me from the privilege of acquiring it.

In Japan the turquois does not occur, and it has been unknown to the Japanese. The Japanese mineralogists, on becoming acquainted with it through our literature, coined the artificial word *turkodama*.

ADDITIONAL NOTES

pp. 1–4. The date of the introduction of the turquois into India may be somewhat more exactly defined by referring to the negative evidence presented by the great Sanskrit-Buddhist dictionary, the Mahāvyutpatti (TH. ZACHARIAE, Die indischen Wörterbücher, p. 39) the Sanskrit text of which, accompanied by a Tibetan translation, is printed in the Tibetan Tanjur (Sūtra, Vol. 123). In Ch. 235 (ed. of MINAYEV and MIRONOV, p. 77, St. Petersburg, 1911) giving the names of precious stones, the word for turquois, *peroja*, is not included, quite in accordance with the fact that the turquois is not spoken of in Buddhist literature. We are therefore justified in concluding that at the time when Buddhism was introduced from India into Tibet, in the seventh and eighth centuries, the stone was not yet known in India, whereas at the same time it was widely known and appreciated in Tibet; thus, Tibetan knowledge of the turquois is not due to an impetus received from India. The Sanskrit-Tibetan equation, *peroja = gyu*, which we might expect does not exist in lexicographical literature. The earliest historical testimony for turquois in India, as shown above p. 3, remains that of al-Bērūnī in the post-Buddhistic or Mohammedan period, and even at his time the turquois cannot have been very generally diffused over India, as at that time it had not yet entered the horizon of the Indian mineralogists.

p. 1. The Persian word *ferozah* or *firozah* (*firūza*) for the turquois means "victorious," and is derived from the word *feroz* or *firoz*, "victory, victorious, successful" (see, for example, JOHNSON and RICHARDSON'S Persian-English Dictionary, ed. by STEINGASS, p. 944). Also the Arabic mineralogist al-Akfānī explains the Persian name of the turquois as signifying "victory"; hence, he says, it is called also "stone of victory" (WIEDEMANN, Zur Mineralogie im Islam, p. 225); likewise, al-Ta'ālibī (*ibid.*, p. 242) has an allusion to this effect. A similar notion seems to be underlying the first of five turquois varieties established by the Lama Klong-rdol (CHANDRA DAS, Tibetan-English Dictionary, p. 1152), called *zil-gnon gyu spyang*, in which term the first element has the significance "overcoming, vanquishing."

p. 3, note 1. It should not be understood that Dioscorides had any knowledge of turquois; he does not mention it (in the same manner as his contemporary Pliny) nor does he have any name that could be interpreted as such. In Ch. 157 of his *Materia Medica* he speaks of the sapphire (*sappheiros*), *i.e.*, lapis lazuli, and says that those bitten by a scorpion will be relieved by taking this stone as a potion (compare F. DE MÉLY, Les lapidaires grecs. Traduction, p. 24, Paris, 1902). It is only in the mediæval work of Ibn al-Baiṭār, the Arabic version of Dioscorides, that the same notion is transferred to the turquois.

p. 14, note 1. The statement that Li Shi belongs to the T'ang period is based on the fact that in the editions of the *Sü po wu chi* he is assigned to the T'ang. This, however, seems to be a mere traditional opinion, while in fact the work is said to date from the Sung period (PELLIOT, *Journal asiatique, Juillet-Août*, 1912, p. 155).

p. 21. M. PELLIOT, who showed me the favor of looking over the galley-proofs of this paper, kindly calls my attention to another interesting text mentioning a fossil tree. This is the *Tu yang tsa pien* (Ch. C, p. 1, edition of *Pai hai*) written by Su Ngo in the latter part of the ninth century (WYLIE, Notes, p. 194). Under the year 841 A. D. mention is made of a tribute sent to Emperor Wu-tsung (841–846) of the T'ang dynasty by the country of Fu-yü. The latter were a tribe, presumably belonging to the Koreans, residing in Liao-tung and in the valley of the Sungari, and are first mentioned in the Annals of the Later Han Dynasty (Ch. 115, p. 2). Their tribute consisted of two objects, three pecks of obsidian (*huo yü, lit.* fire jade, that is, stone of volcanic origin; compare the discussion on obsidian at the end of these notes) and a petrified fir-tree (*sung fêng shi, lit.* fir-tree wind stone) measuring ten (Chinese) feet all round and lustrous like jade. Inside of the stone substance the outlines of a tree were visible. As an old fir-tree bends from the action of the wind, so a cold blast came from the branches of that petrified tree. In the midst of the summer, the emperor ordered the tree to be placed in the rooms of the palace; gradually there arose the sound of the whizzing of the autumn breeze; when the rooms were cooled off, he had the tree brought out again.

p. 23, note 2. According to a communication of M. PELLIOT, the collected works of the poet Lu Kuei-mêng have been published under the title *Li* (No. 6957) *tsê* (No. 11,666) *ts'ung shu* (4 chapters and an appendix), of which there are several modern editions. I find a biographical sketch of his embodied in the *Pei mêng so yen* (WYLIE, Notes, p. 194), Ch. 6, p. 10b (edition of *Pai hai*).

p. 25. The first European author who treated of *sê-sê* was A. PFIZMAIER (Beiträge zur Geschichte der Edelsteine und des Goldes, *Sitzungsberichte der Wiener Akademie*, 1868, p. 210) in translating the two texts relative to the stone in the *Ming huang tsa lu.* He did not explain it, though he was always ready to translate Chinese names, even those being transcriptions of foreign words which are not capable of a literal interpretation.

p. 25, note. M. PELLIOT thinks that the source for the definition of Palladius is K'ang-hi's Dictionary *sub voce sê* (No. 9600) where after the *Yün hui* of the thirteenth century *sê-sê* is defined as a *pi chu*, while the foundation for Couvreur's statement is the commentary to the *Shi king* (K'ang-hi, *sub voce sê*, No. 9599); this, however, refers only to the single word *sê*, not to the later compound *sê-sê* which, as pointed out on p. 47, is the Chinese transcription of a foreign word. No conclusions, accordingly, can be built on the definitions of Palladius and Couvreur in regard to the nature of *sê-sê.*

p. 26, note 3. M. PELLIOT remarks that the text of the *Nan-chao ye shi* is derived from the older work *Man shu* of the T'ang period where the passage relative to *sê-sê* occurs in Ch. 10, p. 48. The *Man shu* is the work of Fan Ch'o and was published about 860; the history of the work is given by PELLIOT (*Bulletin de l'Ecole française d'Extrême-Orient*, Vol. IV, 1904, p. 132).

p. 33. The word *sê-sê* occurs several times in the *Tu yang tsa pien.* In Ch. A, p. 3 (edition of *Pai hai*), its author, Su Ngo, speaks of a peculiar kind of silk threads sent as tribute in 765 A. D. by the country Mi-lo in the Eastern Sea. These threads, of great strength, were knitted into a kind of bag or sheath which on both sides was perfectly translucent like strung *sê-sê.* It follows from this important passage that the *sê-sê* were bright and lustrous stones, and therefore cannot denote the turquois which is dense and non-transparent. Further (Ch. A, p. 8), there is described a marvelous screen which originally belonged to Yang Kuo-chung, a cousin of Yang Kuei-fei (above, p. 33), who died in 756 (GILES, Biographical Dictionary, p. 909). On this screen the figures of the beauties and hetairas of the times of antiquity were engraved, and it was framed with tortoise-shell and rhinoceros-horn. A fringe was suspended from the lower edge and formed by genuine pearls and *sê-sê*,— the whole of such ingenious workmanship that one could hardly believe it was produced by a human hand. A screen having the color of *sê-sê*, thirty feet wide and a hundred feet long, is mentioned (Ch. C, p. 9 b) as having been in the possession of Princess T'ung-ch'ang, curtains and screens made from gold, silver, and *sê-sê* (*ibid.*, p. 12 b); Buddhist pennants or streamers composed of coral, agate, genuine pearls and *sê-sê* (*ibid.*, p. 14 b) to be used in a procession when some sacred bones of Buddha were sent from the temple Fa-mên in Fêng-siang to the capital Si-ngan fu to be shown in the palace and in the monasteries of the city (compare *Kiu T'ang shu*, Ch. 15 A and De Groot, *Album Kern*, p. 135). These five passages relate to the age of the T'ang dynasty and show that *sê-sê*, as then employed in China, were precious stones of transparent quality, on a par with genuine pearls and precious metals; they further bear out the fact that *sê-sê* were jewels not bigger than a pearl, otherwise they could not have been strung together with pearls. All this renders the assumption of *sê-sê* being the turquois impossible and confirms my opinion that it was the balas ruby. We insisted above on the popularity of the word *sê-sê* in the T'ang period. This is fully corroborated by the interesting work *Tu yang tsa pien* where it enters into comparisons from which it becomes clear that the word was very familiar and generally understood at that time. In Ch. c, p. 5 are described three marvelous plants which, when eaten, guard man from old age. The first of these is called ***shuang lin chi***, "the agaric with the double *lin* (female unicorn)," and is described as a plant with one stalk and two flowers so hidden away that they are scarcely visible, and shaped like a *lin* with head and tail, all complete; and they produce seeds like ***sê-sê***.

p. 36, note 1. Turquois-mines in the district of Upper Nasiyā in Ferghana are mentioned by Ibn Haukal (978 A. D., ed. of De Goeje, *Bibl. Geogr. Arab.*, p. 397), as Mr. Guy le Strange, the excellent Persian scholar of Cambridge, England, has been good enough to write me. M. Pelliot refers, as regards turquois-mines of Khojend, to Pavet de Courteille, Baber nameh, Vol. I, p. 7. This work is not accessible to me, but I find in the new English translation of A. S. Beveridge (The Memoirs of Bābar, p. 8) the passage as follows: "To the north of both the town [Khojend] and the river lies a mountain range called Munūghul; people say there are turquois and other mines in it, and there are many snakes." There is, accordingly, no longer any reason to doubt the indigenous occurrence of turquois in the territory of Ferghana, and it will be correct to assume that it was mined there from the latter part of the tenth century.

p. 40. Mr. Guy le Strange has been good enough to refer me to the fact that the text of the passage of Ibn Haukal (Hauqal or Hawqal, as others spell it), the continuer or re-editor of Iṣṭakhri, is found in De Goeje's Bibl. Geogr. Arab., p. 313; the turquois mines, according to him, were near Nūqan, which is Tus to the north of modern Meshed. On p. 362 of the same work, celebrated turquois mines are mentioned in Transoxania near the mountains called Jabal-Buttam.

p. 43, note 2. In regard to the ***uk-nu*** stone mentioned in the Assyrian inscriptions Mr. Pinches has shown that it denotes lapis lazuli from the Zagros range (*Journal Royal Asiatic Society*, 1898, p. 259, note 1). I have no judgment on this point.

p. 44, note 2, and p. 62. It is assumed by several authors that lapis lazuli is found in China. A. Williamson, who has written an interesting article on the productions of northern China (*Journal China Branch R. As. Soc.*, Vol. IV, 1868, p. 41), asserts on hearsay reports that in Shan-si, and among the hills in the south of Shen-si, precious stones, such as lapis lazuli, ruby, etc., abound, and that he has every reason to believe the report correct. F. Porter Smith (Contributions towards the Materia Medica and Natural History of China, p. 129, Shanghai, 1871) who takes the word ***liu-li*** in the sense of lapis lazuli says that the blue mineral known by this name is met with in very fine specimens in China and Central Asia. In the "Catalogue spécial des objets exposés dans la section chinoise à l'exposition de Hanoi, 1902" (p. 121) mention is made of the lapis lazuli of the Island of Hainan. In the latter case it is more than probable that the determination is wrong and merely due to a confusion with cobalt which, as well known, is obtained on Hainan (Hirth, Chinesische Studien, p. 251). According to R. Pumpelly (Geological Researches, p. 117, *Smithsonian Contributions to Knowledge*, Vol. XV, Washington, 1867) lapis lazuli is found at Mount Nien in the district of Ch'ang-shan, prefecture of K'ū-chou, Chêkiang Province, and in the district of Lo-ts'ing, prefecture of Wên-chou, of the same province. These statements, however, as the entire list of minerals in which they are contained, are based on the *Ta Ts'ing i t'ung chi* and other Chinese sources examined by "the author's Chinese secretary" (p. 109). But I am at a loss to explain where the Chinese secretary found these statements. There is nothing to this effect to be met in the *Ta Ts‘ing i t‘ung chi*. Among the products of K‘ü-chou fu (Ch. 233, p. 9) are mentioned, after the *Ta Ming i t‘ung chi*, ink-slabs produced in the two districts of Ch‘ang-shan and K‘ai-hua, but no other kind of mineral; in the account of Wên-chou fu (Ch. 235, p. 10) no stone is registered. Perhaps his statement is derived from his "other Chinese sources"; but even then we should like to know the Chinese word translated by him "lapis lazuli," and as he does not give it, his note is rather valueless. As pointed out on p. 44, note 2, we meet in the *Ta Ts‘ing i t‘ung chi* the word *kin sing shi* (*lit.* gold star stone) in Ch. 398, p. 3 b, description of Sze-chou fu in Kuei-chou Province, where it is said that this stone occurs east of the city of Sze-chou in the Kia-ch‘i Lake, and that, according to the Provincial Gazetteer, stars and spots appear on its surface, that it is hard and glossy and can be worked up into ink-slabs. Giles (in his Dictionary, p. 252c) explains *kin sing shi* by "iron and copper pyrites," in agreement with F. Porter Smith (Contributions towards the Materia Medica and Natural History of China, p. 123, Shanghai, 1871). I do not wish to push this discussion any further, as the second word cannot be spoken before the first has been said. Specimens suspected of being lapis lazuli must be procured from the various localities where they are reported to occur, and examined by competent mineralogists. Others like T. Wada (*Beiträge zur Mineralogie von Japan*, No. 1, p. 21) deny that lapis lazuli is found in China, and are of the opinion that it is imported from Central Asia.

p. 45. Incidentally I wish to refer here to a now antiquated investigation of T. de Lacouperie, On Yakut Precious Stones from Oman to North China, 400 b. c. (*Babylonian and Oriental Record*, Vol. VI, 1893, pp. 271–4), in which the Chinese *ye kuang chu*, "the bead or pearl shining at night," is set in relation with the Arabic word for the ruby *yakut* (an etymology impossible for philological and historical reasons; in fact, the Chinese term is not a transcription of any foreign word but a thoroughly Chinese formation) and identified with the ruby, "probably from Badakshān, the chief source of these stones at that time."

p. 46, note 1. The date of Yang Shên, as given by Mayers, is correct; it is given as the same by Chavannes (*T‘oung Pao*, 1904, p. 474) who notes his biography after *Ming shi* (Ch. 192). Yang Shên wrote the *Nan-chao ye shi* in 1550.

p. 49. For the elucidation of this text I am greatly indebted to M. Pelliot who will himself take it up in his proposed study of the history of the Nestorians in China. M. Pelliot says that he has not found the text in the *Hua yang kuo chi*, but on the other hand has not succeeded in discovering a trace of an independent work *Hua yang ki*. The quotation given from Chao Pien is not contained in the latter work, but is taken from another source. According to the *Sung shi*, Chao Pien lived in fact from 1006–1084, as will be demonstrated by M. Pelliot in the publication mentioned, but it is not certain whether he is the author of the *Shu tu ku shi*. What is rendered above by monolith is in the text *shi sun* (Nos. 9964, 10438) by which M. Pelliot is inclined to understand megalithic monuments. These stone ruins are the remainders of an ancient tomb (compare *Ch‘êng-tu hien chi*, 1873, Ch. 2, p. 3 b, and *Sze-ch‘uan t‘ung chi*, Ch. 48, p. 66 b), and have nothing to do with the Temple of Ta Ts‘in. In the last number of the *Journal asiatique* (*Mars-Avril*, 1913, p. 308), Chavannes and Pelliot alluding to the text of *Neng kai chai man lu* incline toward the opinion that the temples of Ta Ts‘in are due to the Nestorians.

p. 52. Also Qazwīnī (1203–83) mentions the onyx of China (Sīn) with the curious addition that the people of Sīn repudiate the quarrying of the onyx mines, which is left only to slaves who cannot otherwise eke out a living and sell the stone in countries outside of Sīn (J. Ruska, Das Steinbuch aus der Kosmographie des al-Qazwīnī, p. 12).

p. 53, note 3. The statement that the *Shi si yü ki* seems to be lost is based on Bretschneider's authority; besides the quotation as given there, his Mediæval Researches (Vol. II, p. 268) ought to have been pointed out, where the same is repeated. But this is contradictory to what Bretschneider says on p. 147 of the same volume that the book in question seems to be still extant and is noticed in the Imperial Catalogue (Ch. 64, p. 5). Also M. **PELLIOT** thinks that the work is extant, but there are no modern editions of it.

p. 55, note 5. As the emerald is not made mention of in the Bower Manuscript of about 450 A. D., it would be justifiable to conclude that, taking the positive testimonies into consideration, the emerald was introduced into India not earlier than the beginning of the sixth century A. D. The passage of Cosmas regarding the emerald will be found on p. 371 of **MAC CRINDLE**'s translation (Christian Topography, ed. of *Hakluyt Society*, London, 1897).

p. 56, note 3. T. **WATTERS** (Essays on the Chinese Language, p. 352) believed he recognized the Persian word *firūza* in Chinese *pi-liu* (Nos. 9009 and 7245) or *pi-liu shi* (stone) to which he ascribes the meaning of turquois (observation of M. **PELLIOT**). But the source from which the Chinese word is derived is not given.

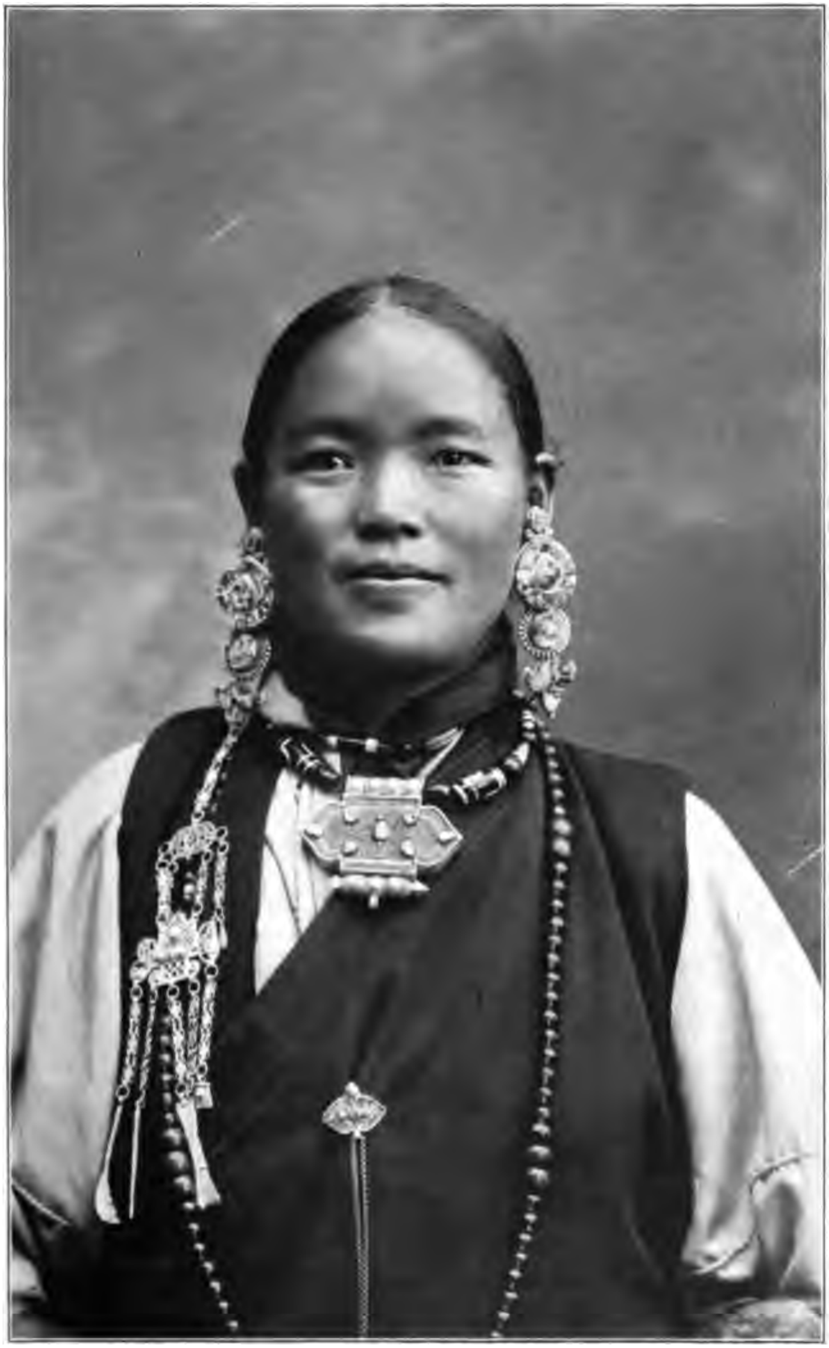
The discourse on *sê-sê* has furnished sufficient proof for the fact that the Chinese designation of a stone may refer to different species according to different localities, and that the significance of such a word may undergo changes in course of time. Moreover, we observe that the name of a stone used with reference to a foreign country does not necessarily denote the same species as the same name when applied to the domestic variety. An interesting case of a similar bearing is presented by the account on Japan in the Annals of the Later Han Dynasty (*Hou Han shu*, Ch. 115, p. 5 b) where white pearls (*pai chu*) and (what from a Chinese point of view would be a literal translation of the term) "green jade" (*Ts'ing yü*) are mentioned as products of Japan; indeed, the term has thus been translated, for instance, by E. H. **PARKER** (*China Review*, Vol. XVIII, p. 219 a). But it is evident that this translation cannot be correct, for we know surely enough that Japan does not produce jade (see Jade, pp. 351–4). It is therefore manifest that the word *ts'ing yü* in the above text relates not to any kind of jade but to a Japanese stone, and that the term must be taken from a Japanese, not a Chinese viewpoint, and it may be inferred also that it must designate a mineral peculiar to Japan and absent in China. The Chinese character *yü* is read in Japanese *tama*, and this Japanese word signifies any gem or precious stone in general, or even more commonly a bead or ball of any stone. The color name *ts'ing* (Japanese *aoi*, Sinico-Japanese *sei*) is of uncertain quality and refers to the general color prevalent in nature, green, blue, black, gray, usually meaning any dark neutral tint. Such a substance playing a large rôle in the antiquity of the Japanese and the Ainu is obsidian. It is unknown in China, but found in several localities of Japan (Bungo, Izu, Kai, Shinano, Tokachi: N. G. **MUNRO**, Prehistoric Japan, p. 292, Yokohama, 1908). It was largely utilized, as in ancient Mexico, for the manufacture of arrowheads, and abundant flakes scattered around in the sites mentioned testify to its popularity. As elsewhere, it was worked up also into beads and balls to enter into personal adornment.

P. F. v. **SIEBOLD** (Geogr. and Ethnogr. Elucidations to the Discoveries of M. G. Vries, p. 175, Amsterdam, 1859) reports on obsidian balls received from Yezo, "from two feet to two feet and a half in diameter, coal-black of color, and some small blue pieces of stone, of which probably the so-called *Krafto* (properly *Karafuto*) *tama*, or precious stone of *Krafto* is formed." It could appear from this statement that obsidian and the blue *Karafuto tama* are considered by Siebold as different stones; but, in another passage of the same book (p. 105), he comments on a blue bead chain noticed by Vries in the ears of an Ainu woman of Saghalin that "the most precious are the blue obsidian which they call *Krafto tama*, precious stone from *Krafto;* these blue corals [?] are found among all the peoples of the frigid zone, of the northern hemisphere, from the Great Ocean up to Behring's Straits, where they were found by von Kotzebue in the Sound which bears his name." A. J. C. **GEERTS** (Les produits de la nature japonaise et chinoise, p. 294, Yokohama, 1878) describes precious stones under the name *ruri-tama* (written with the Chinese characters *liu-li yü*) as of deep-blue color and entering into the necklaces of the ancient Japanese (the *shitogi* of the Ainu). He identifies them with lapis lazuli, and says that these very rare stones have been found on the Kurile Islands, several specimens of which are in the Museum of Tōkyō. Under the name Karafuto-tama, that is, jewels of the Island of Saghalin, the precious stone par excellence of Saghalin and the Kuriles is understood, made into the necklaces called *shitogi*. They are well polished lustrous balls of blue or bluish color, but less dark than the *ruri-tama*. They are the product, adds Geerts, of dark blue obsidian varying much in size; they belong, as the preceding stone, to a period posterior to the *maga-tama* and still serve as ornaments to the natives of the Kuriles. It is more than likely that the *ruri-tama* and *Karafuto-tama* are identical, and that the material in question is obsidian. Obsidian, as well known, is not a mineral proper but a natural glass, a black vitreous volcanic rock being produced where a rapid cooling of certain liquid lavas has taken place and occurring in many parts of the world, the coloration being black, gray, brown, yellow, red, green, sometimes also blue. A peculiar variety is known to our mineralogists from the river Marekanka near Okhotsk in eastern Siberia, hence called *marekanite;* these obsidian balls are partly colored evenly, partly of brown and gray, frequently also of yellow and red hues (Max Bauer, Edelsteinkunde, p. 551). O. C. Farrington (Gems and Gem Minerals, p. 181) gives for it also the name "mountain mahogany," and says that it makes a pretty stone, which is used for the manufacture of some objects. This material is doubtless the source for the precious beads of Saghalin and the Kuriles. Nothing is known to Japanese or foreign mineralogists of lapis lazuli found on the Kuriles, and the definition of Geerts must be considered an error. In the Ainu collection of the Field Museum there is a necklace (Cat. No. 88037) coming from Hakodate on Yezo, in which are strung six large, black obsidian balls (about 3 cm in diameter), together with many blue, green and white glass beads. J. Batchelor (The Ainu and Their Folk-lore, p. 154, London, 1901) states that the glass beads of which the Ainu women are extremely fond are of Japanese make, others appear to have come from China; the people believe that the ancients got them from the *Rushikai*, that is, Russians and Manchu. In the Annals of the Later Han Dynasty (*Hou Han shu*, Ch. 115, pp. 5a, 5b) the countries of the Fu-yü (see above) and the Yi-lou who lived over 1000 *li* north-east of the Fu-yü are reported to produce "red jade" (*chʻi yü*). Also in this case, the word *yü* cannot be construed to have the literal meaning of "jade," as no jade is found in those localities which were inhabited by the Fu-yü and Yi-lou, and I am inclined to regard the term *chʻi yü* as having likewise the significance of obsidian. The evidence for this supposition is furnished by the *Tu yang tsa pien* (Ch. C, p. 1) in the passage above alluded to. In the tribute sent by the Fu-yü in 841 A. D. to Emperor Wu-tsung there were three pecks of "volcanic jade" (*huo yü san tou*), which was red (*chʻi*) in color. The pieces were half an inch long, pointed on top, and round below; they emitted their brilliancy at a distance of ten paces. Gathered in a cauldron they could be ignited, and the heat of such a cauldron placed in the house was sufficient to dispense with double quilted garments [which the Chinese use to wear in the winter, heating their bodies instead of their rooms]. The court-ladies of inferior rank availed themselves of this fire to heat a brand of wine called "clear wine" which had been sent as the gift of a foreign country. There can be no doubt of the identification of the term *huo yü* with obsidian; this expression literally means "fire jade," and "fire mountain" (*huo shan*) is the Chinese word for a volcano; *huo yü*, accordingly, is a fine stone of volcanic origin, and such a product of volcanic outflows is obsidian. The account of this substance being utilized as a combustible is quite credible, for obsidian "fuses rather easily before the blowpipe to a porous, gray mass" (O. C. Farrington, *l.c.*, p. 180). This "fire jade" was red in color; accordingly, it was a *chʻi yü*, and this is the very designation which we encounter in the Annals of the Later Han Dynasty. For this reason we may conclude that the term *chʻi yü*, as pointed out in the above passage, serves for the designation of obsidian which itself was unknown in China.

PLATE II

Woman from southern Tibet, to illustrate the mode of wearing jewelry: gold earrings inlaid with a mosaic of turquois; gold amulet box (*gau*), the surface being filled with a network of designs formed of gold filigree and inlaid with seven choice turquoises of first quality; necklace composed of large turquois, amber and coral beads; and silver chatelaine with ornamental halberd, toothpick, ear spoon, tweezers and small brush (lost) for oiling the hair (see Jade, p. 203).

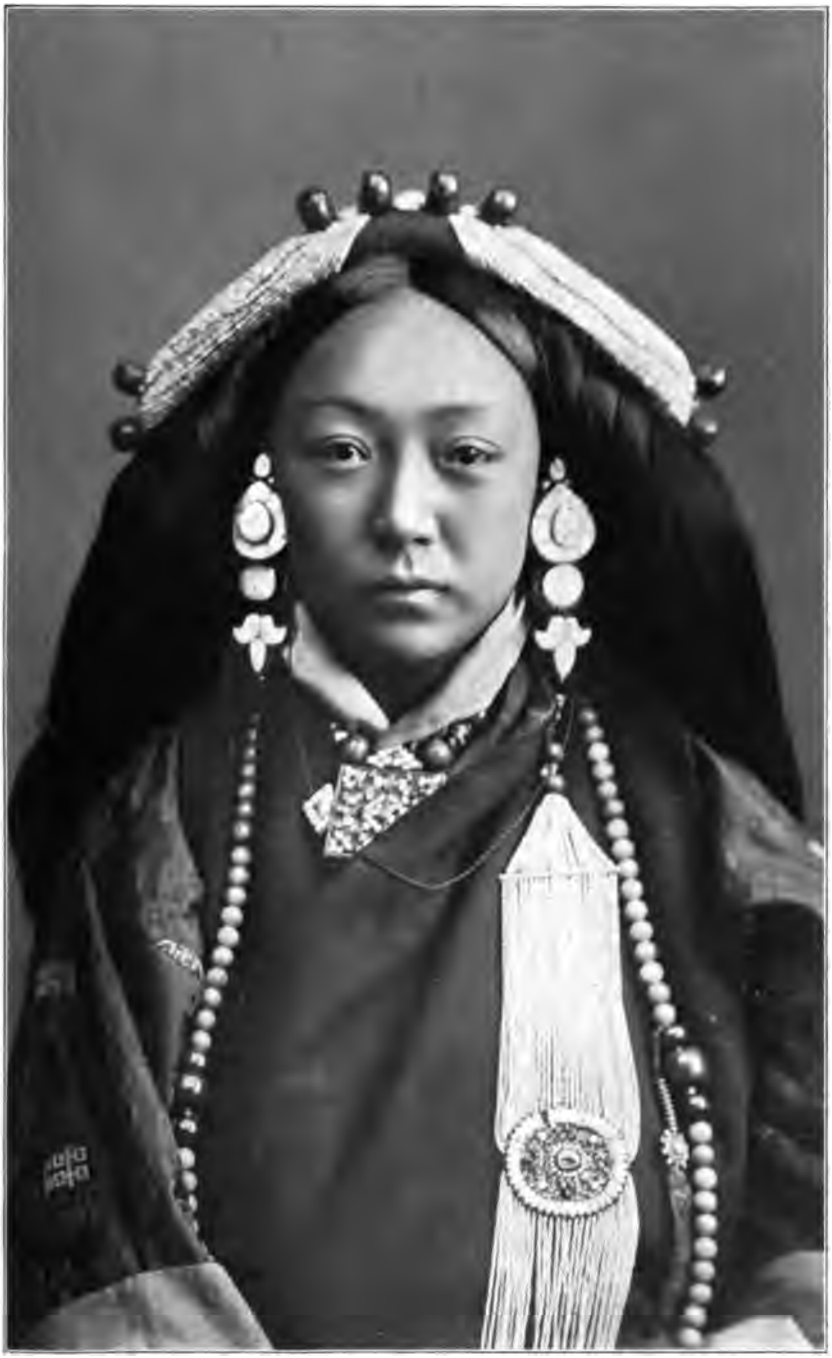
All ornaments worn by this woman were acquired for the Field Museum (exhibited in the Gem Room, with a large collection of other Tibetan and Nepalese jewelry).



TIBETAN WOMAN SHOWING MANNER OF WEARING JEWELRY.

PLATE III

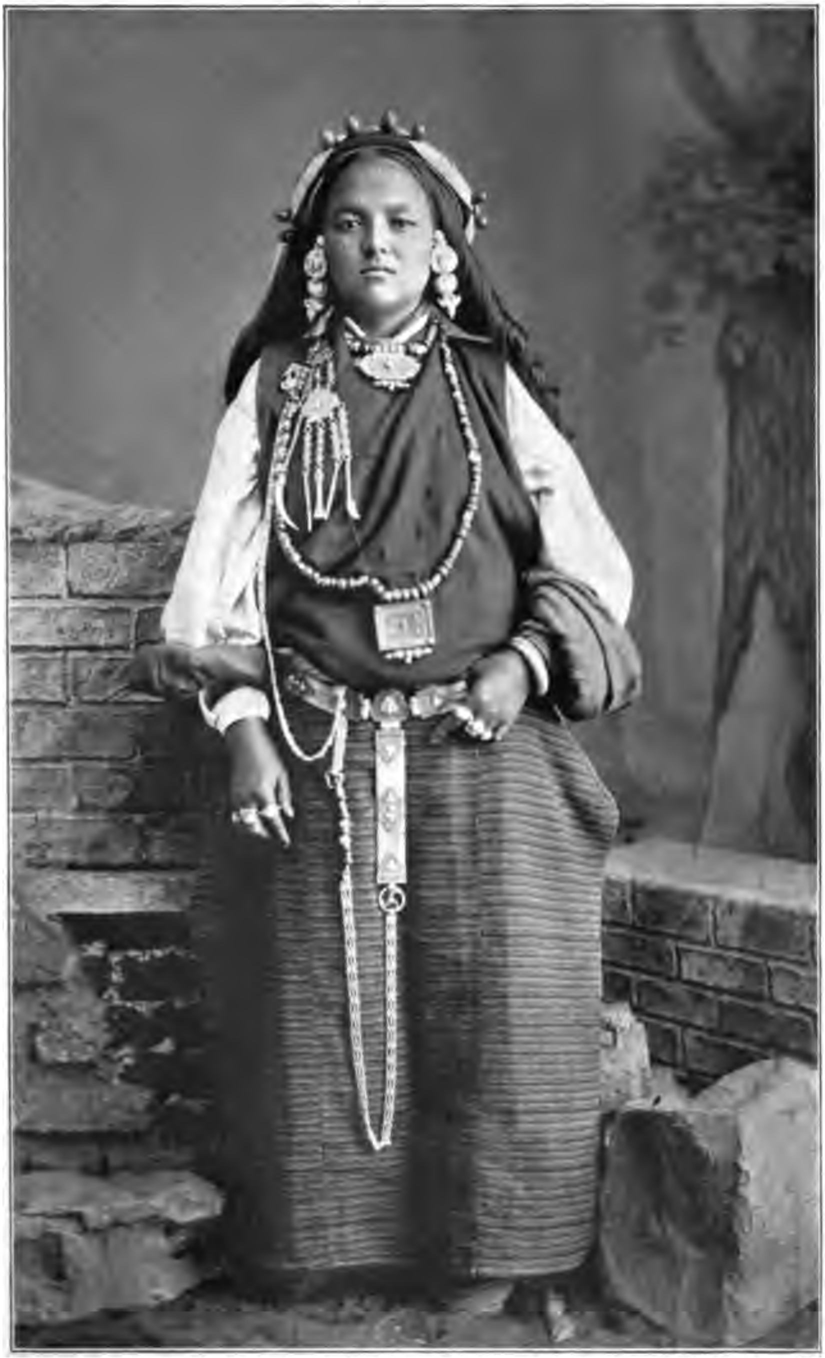
Tibetan woman in festival dress of Chinese silk. The chaplet is worn over an artificial wig of long flowing hair imported from China. The turquoises are sewed on to a foundation of stiff red cloth, and bandeaux formed by rows of artificial pearls are laid around the sides.



TIBETAN WOMAN IN FESTIVAL DRESS

PLATE IV

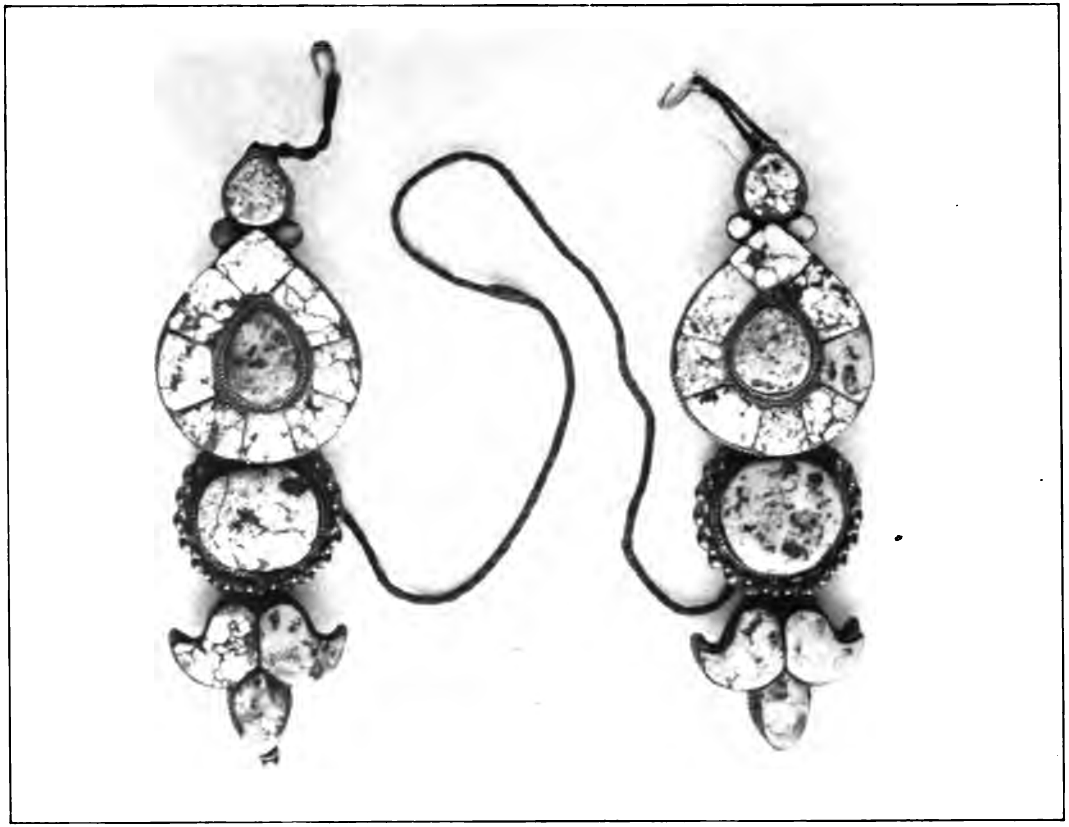
Tibetan woman wearing chaplet set with turquoises and artificial pearls; turquois earrings; copper charm-box inlaid with turquoises suspended from a necklace; a quadrangular silver charm-box attached to the rosary; a silver chatelaine with five utensils; a silver belt with chain (called *digra*) falling down over the apron, caught up and fastened to the belt, and then again to the bodice, where it terminates in the figure of a rooster of silver. It is covered with plaques of gold filigree set with turquoises. She wears silver rings set with turquoises on the middle and fourth fingers of both hands, a white conch-shell as bracelet on her right arm, and a Chinese silver bracelet on her left arm.



TIBETAN WOMAN WITH COMPLETE JEWELRY.

PLATE V

Pair of Tibetan earrings, foundation of gold inlaid with a mosaic of turquois. The requirement of these mosaics is that the stones shall be well matched in color, resulting in an harmonious color arrangement. With this end in view, Tibetan women gather turquoises during many years, till they have the desired colors in the required number of stones. Such earrings belong to the most cherished property of a Tibetan woman and range from a hundred to six hundred rupees and more in price. From collection of Field Museum (exhibited in Gem Room).



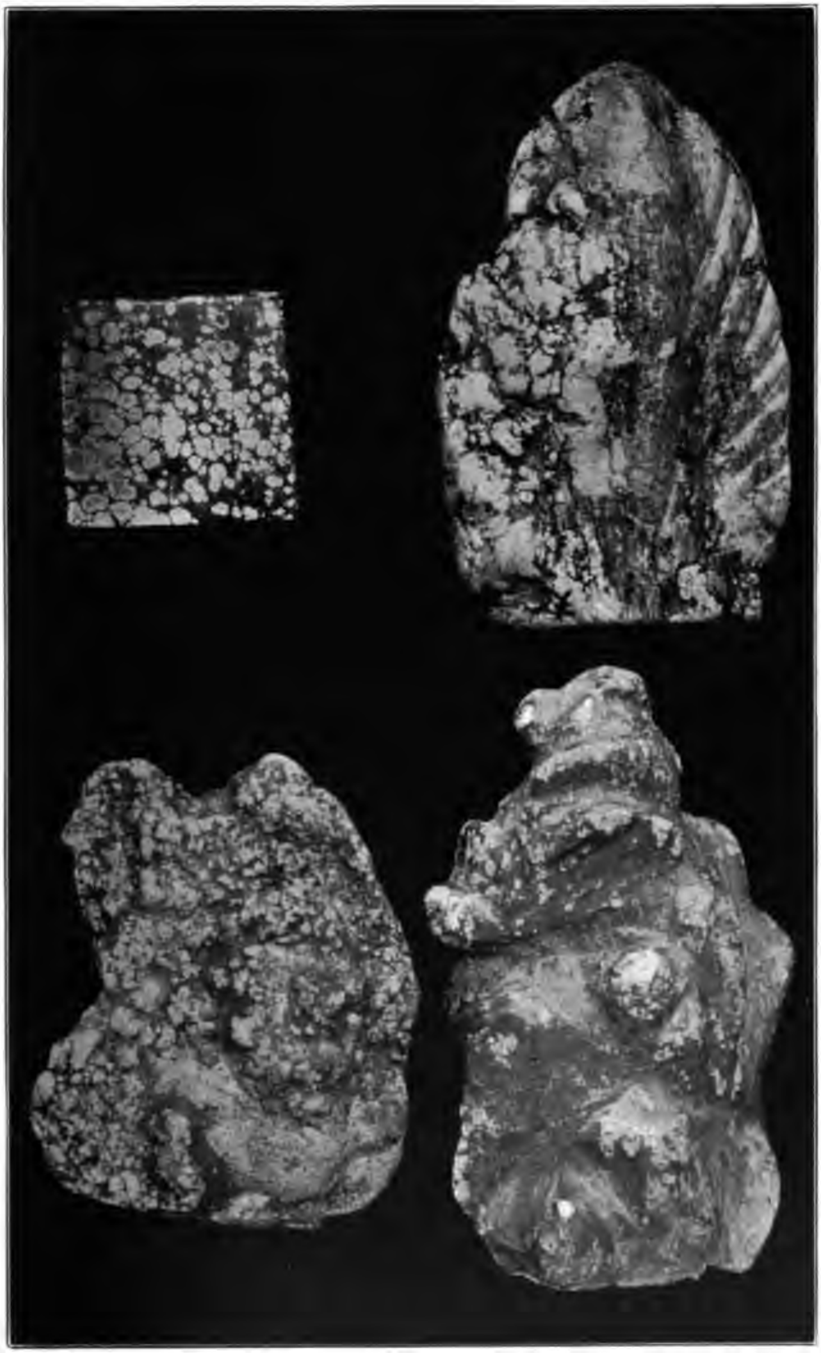
TIBETAN TURQUOIS EARRINGS.

PLATE VI

Chinese Turquois Carvings.

Fig. 1. Flat, polished and perforated turquois of dark-blue color with black strata, mined in Hu-pei Province and worked in Si-ngan fu. Cat. No. 116679/3.

Figs. 2–4. Fanciful carvings of turquois, Si-ngan fu, made for Tibetan and Mongol Lamas who use them as decorations on their tables, and also as paper-weights, 10, 8.5, and 12 cm high, respectively. Cat. Nos. 116663, 116664, 116666.



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CHINESE TURQUOIS CARVINGS.

PLATE VII

Chinese Turquois Carvings.

Fig. 1. Bird carved from turquois, serving for decorative purposes, and also as paper-weight, Si-ngan fu. 12.4 cm long, 3.8 cm high. Cat. No. 116665.

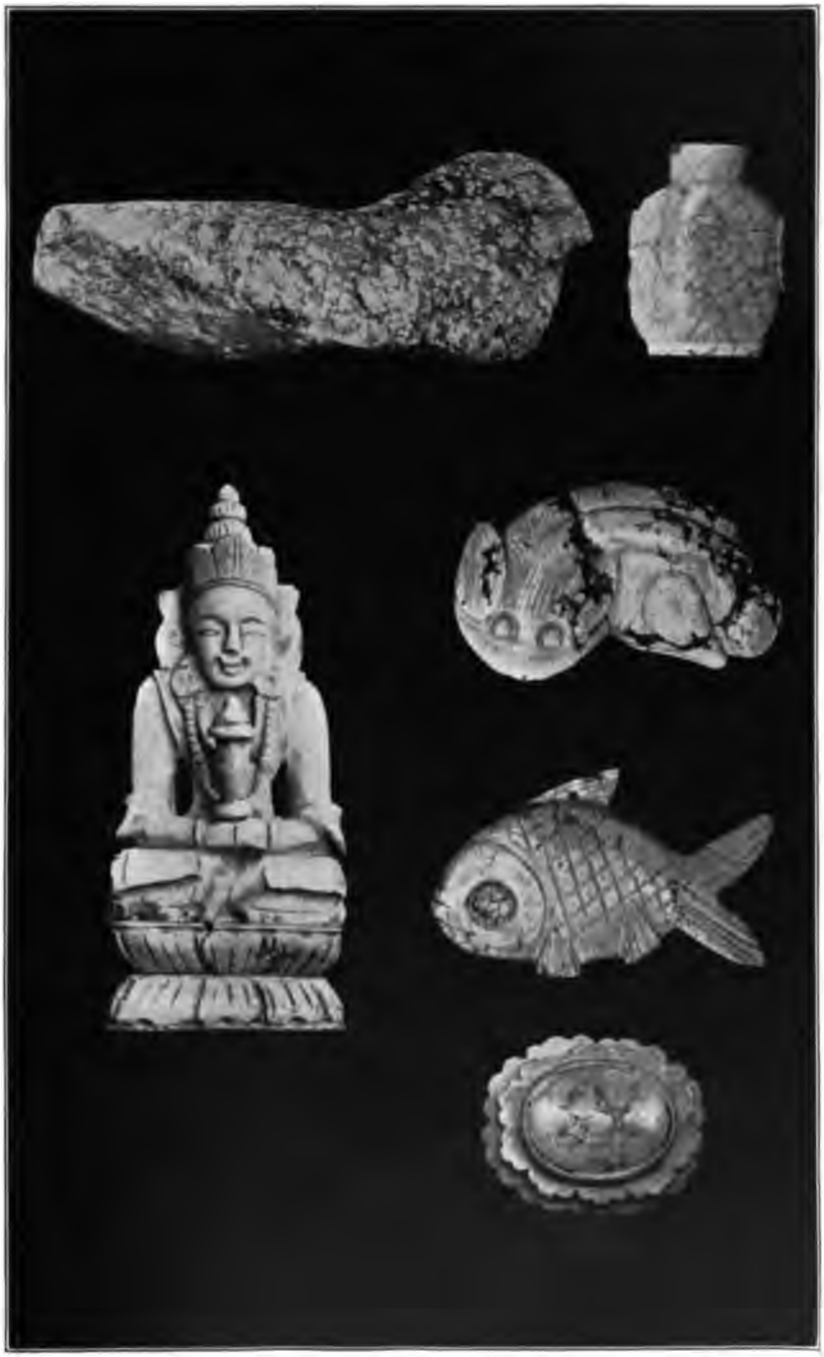
Fig. 2. Snuff-bottle carved from turquois, Peking. 3.3 cm high. Cat. No. 116670.

Fig. 3. Turquois carving of recumbent tiger, used as girdle-pendant, Si-ngan fu. 5.3 x 3 cm; 2.2 cm high. Cat. No. 116668.

Fig. 4. Turquois carving of fish, both sides alike, used as girdle-pendant, Si-ngan fu. 5.4 x 3.3 cm. Cat. No. 116667.

Fig. 5. Turquois carving of ornamental button in shape of blossom with a double row of petals, worn in front of cap or fillet, Si-ngan fu. 3.5 x 3 cm. Cat. No. 116669.

Fig. 6. Image of the Dhyānibuddha Amitābha, Lamaist type, carved from turquois, Peking. 6.7 cm high. Cat. No. 116673.



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CHINESE TURQUOIS CARVINGS.

PLATE VIII

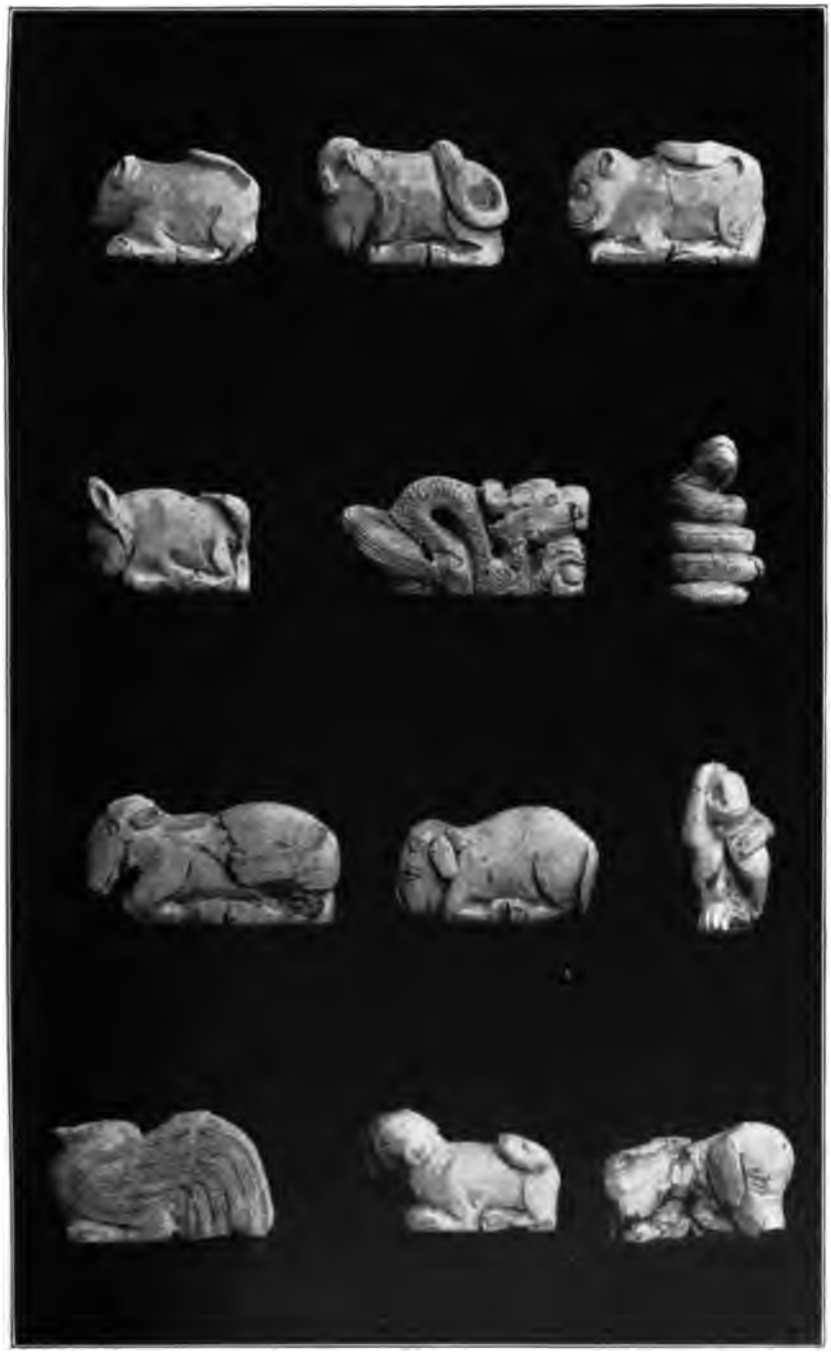
Chinese Turquois Carvings.

The Twelve Animals representing the periodical cycle of twelve years. Carved from turquois, Peking. Average dimensions of figures 5 x 3 cm, with a height of 2 cm. Cat. No. 116674.

The animals are:

1. Rat.
2. Ox.
3. Tiger.
4. Hare.
5. Dragon.
6. Serpent.
7. Horse.
8. Ram.
9. Monkey.
10. Rooster.
11. Dog.
12. Boar.

See p. 63.



Chinese Turquois Carvings.

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CHINESE CLAY FIGURES

PART I

PROLEGOMENA ON THE HISTORY OF DEFENSIVE ARMOR

BY

Berthold Laufer
Associate Curator of Asiatic Ethnology

64 Plates and 55 Text-figures

The Mrs. T. B. Blackstone Expedition

Chicago
1914

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VII. Horse Armor and Clay Figures of Horses 306

CHINESE CLAY FIGURES

PART I

PROLEGOMENA ON THE HISTORY OF DEFENSIVE ARMOR

I. HISTORY OF THE RHINOCEROS.

An extensive collection of ancient clay figures gathered in the provinces of Shen-si and Ho-nan during the period from 1908 to 1910 is the basis of the present investigation. As the character of this material gives rise to research of manifold kinds, it has been thought advisable to publish it in two separate parts. Many of the clay statuettes which form the nucleus of our study are characterized by the wear of defensive armor, hence this first part is devoted to an inquiry into the history of defensive armor,—a task of great interest, and one which heretofore has not been attempted. It will be recognized that this subject sheds new light on the ancient culture of China and her relations to other culture zones of Asia. The second part of this publication will deal in detail with the history of clay figures, the practice of interring them, the religious significance underlying the various types, and the culture phase of the nation from which they have emanated.

Before embarking on our subject proper, a preliminary question must be decided. It is the tradition of the Chou period that the cuirasses[1] employed at that time were manufactured from the hides of two animals designated by the words *se* (No. 10,298) and *si* (No. 4218).[2] It is imperative to have a clear understanding of what these two animals were in the early antiquity of China. As this problem is still pending, and as a close and coherent investigation of the matter has never been made, I have decided to treat it from the very beginning by means of all accessible methods, with the possible hope of a final solution.

The present state of the problem is as follows: Edouard Biot,[3] the ingenious translator of the *Chou li*, has expressed his opinion in these words: "I translate by *buffalo* the character *si*, and by *rhinoceros* the character *se*. These two characters[1] denote in the *Shi king* a rhinoceros or a wild buffalo, without the possibility of distinguishing between them. The skin of the rhinoceros being very thick, it seems difficult to believe that it could have been sliced, and that the pieces were sewed together, in order to make cuirasses. In this case the two characters of the text[2] would designate here two species of buffalo."[3] Palladius, in his Chinese-Russian Dictionary, treats the matter in the opposite way, and renders *se* by (1) "an animal resembling a wild ox," (2) "Malayan rhinoceros," and *si* by "rhinoceros." Couvreur credits the word *se* first with the latter meaning, secondly with that of *bœuf sauvage*.[4]

---

[1] "Cuirass" or "cuirbouilly" is the right term for this kind of armor, as these words (like French *cuirasse*, Italian *corassa*) go back to Latin *coratium* ("a breastplate of leather"), derived from the word *corium* ("leather").

[2] These figures refer to the numbers of the Chinese characters in the Chinese-English Dictionary of H. A. Giles.

[3] Le Tcheou-li, ou Rites des Tcheou, Vol. II, p. 507 (Paris, 1851).

Chavannes[5] has clearly and sensibly expressed the opinion that

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[1] It should properly read, "words."

[2] Referring to the passage of the *Chou li* where the hide cuirasses are mentioned.

[3] In his essay on the Manners of the Ancient Chinese (in Legge, Chinese Classics, Vol. IV, Prolegomena, p. 148), Biot says that "they hunted also herds of deer, of boars, of wild oxen," on which Legge annotates, "These wild oxen would seem to be rhinoceroses." But in his original article (*Journal asiatique*, 1843, p. 321), Biot has added the following comment: "Le caractère *si* est traduit ordinairement par rhinocéros, et c'est, en effet, son sens actuel. Lacharme a traduit, tantôt *bos sylvestris*, tantôt rhinocéros. Il me semble que les grandes chasses devaient être dirigées surtout contre des troupeaux de bœufs sauvages ou buffles." The objections raised by Biot in the above passage are not valid; it is certainly possible to slice rhinoceros-hide, and to sew the pieces together. Cuirasses and shields have been made from it, as may be seen from many specimens in the collections of our museums. A shield of rhinoceros-hide is illustrated in Plate XXVII. In accordance with the above definition, Biot, likewise in his translation of the Annals of the Bamboo Books (Extrait du *Journal asiatique* 1841 and 1842, pp. 41, 46), rendered *se* by "rhinoceros" and *si* by "bœuf-*si* (rhinocéros)," while Legge (Chinese Classics, Vol. III, Prolegomena, pp. 149, 153) in both cases has "rhinoceros." It will be seen in the course of this investigation how Biot's error was caused, and that his opinion is untenable. W. R. Gingell (The Ceremonial Usages of the Chinese, p. 81, London, 1852) treated the two words in a way opposite to that of Biot, translating in the passage of *Chou li* the term *si kia* by "rhinoceros-hide armor" and *se kia* by "wild buffalo's-hide armor." No one of those who from purely philological points of view proposed the rendering "wild buffalo" has ever taken the trouble to raise the question whether anything like wild buffalo exists in China, anciently or in modern times. Bushell (The Stone Drums of the Chou Dynasty, *Journal China Branch R. As. Soc.*, Vol. VIII, 1874, p. 154) was of the opinion that the ancient Chinese hunted the rhinoceros in the low swamps.

[4] The passage in *Lun yü* (xvi, 7) is translated by Couvreur (Les quatre livres, p. 250), "Si un tigre ou un bœuf sauvage s'échappe de sa cage." Nevertheless in the glossary (p. 664) the word *se* is rendered by "rhinoceros." Legge (Chinese Classics, Vol. I, p. 307) translates here "rhinoceros," despite Chu Hi's (undoubtedly wrong) interpretation of *se* being a *ye niu* ("wild bull"). In his first edition of *Lun yü* (which is not accessible to me, but this may be gleaned from Plath, Die Beschäftigungen der alten Chinesen, p. 56), Legge translated *se* by "wild ox." In the text of *Mêng-tse* (III, 2, ix, 6), Legge (Classics, Vol. II, p. 281) and Couvreur (*l. c.*, p. 452) are in mutual accord in translating the word *si* by "rhinoceros," and this is likewise the case with reference to the word *se* in *Li ki*, II, 1, iii, 40 (Legge in *Sacred Books of the East*, Vol. XXVII, p. 158; Couvreur, *Li ki*, Vol. I, p. 181). In *Tso chuan*, vii, 2, Legge (Classics, Vol. V, p. 289) renders *si se* by "rhinoceroses and wild bulls."

[5] Les Mémoires historiques de Se-ma Ts'ien, Vol. III, p. 502.

se niu and *si* appear to be two different species of rhinoceros. Also G. Devéria[1] has translated *se* and *si* by "rhinoceros."

Bretschneider, both a naturalist and an eminent sinologue, upheld the opinion that the rhinoceros, and goblets made from rhinoceros-horn, are repeatedly mentioned in the Chinese classics, and that the latter has been reputed from time immemorial for its antipoisonous virtues. He refers the saying that rhinoceros-horn cures all poisons, to the *Shên-nung pên ts'ao king*, attributed by tradition to the mythical Emperor Shên-nung, at all events the most ancient Chinese materia medica in existence.[2]

In the first edition of his Chinese-English Dictionary, Professor Giles, the eminent sinologue at the University of Cambridge, England, attributed to both *se* and *si* the meaning of "rhinoceros," without establishing a distinction between the two. In the second edition, however, we read under *se* (No. 10,298), "A bovine animal, figured as a buffalo with one horn, known as the *se niu*. Another name for the *si* 4128; see 8346 for its confusion with the rhinoceros." Under the last-named heading it is said that the term *si niu* is "a bovine animal, figured as a buffalo with a single horn;" with the addition that the traditional "rhinoceros" of foreigners seems to be wholly wrong. Further, the reader is requested to correct No. 4128 *si*, where the meanings "tapir" and "rhinoceros" had been given. In his "Adversaria Sinica" (p. 394), Mr. Giles has expounded more in detail the reasons which induced him to make these alterations. The arguments advanced by him are briefly three: 1. The rhinoceros is known to the Chinese as *pi kio*, "nose-horn." 2. In two passages of Chao Ju-kua (translation of Hirth and Rockhill, pp. 118, 233), rhinoceroses are spoken of as being shot with arrows, while Giles finds it stated in the *T'u shu tsi ch'êng* that arrows cannot pierce the hide of the rhinoceros. 3. The *si* and the *se* are figured in the latter work as slightly differing

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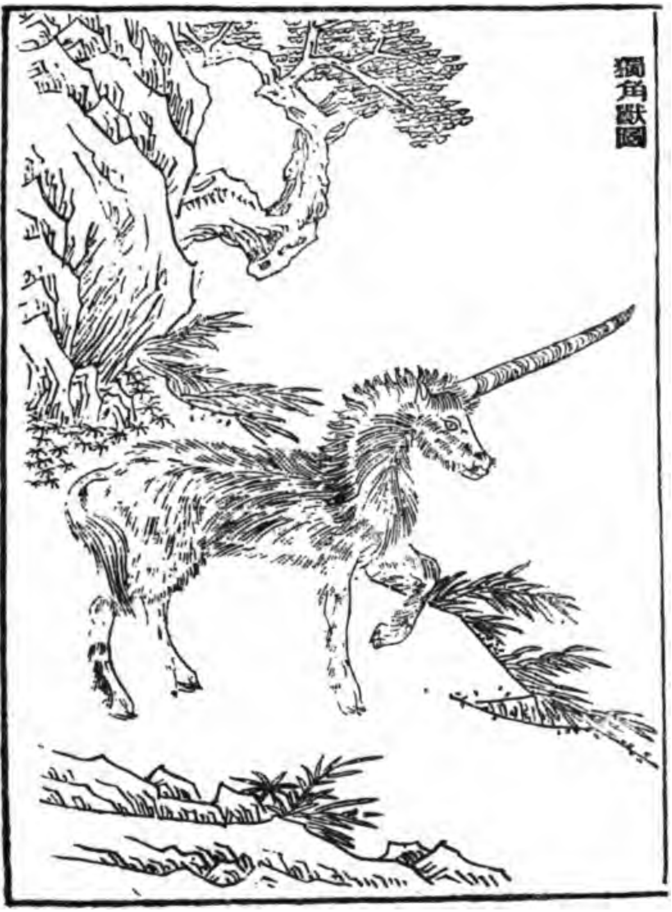
[1] Histoire des relations de la Chine avec l'Annam, p. 88 (Paris, 1880).

[2] *Chinese Recorder*, Vol. VI, 1875, p. 19, and Mediæval Researches, Vol. I, p. 153. Regarding the materia medica current under the name of Shên-nung see Bretschneider (Botanicon Sinicum, pt. 1, pp. 27–32). Bretschneider, though believing that in India the people from time immemorial attribute the same antipoisonous virtues to the rhinoceros-horn as the Chinese do, says he cannot believe that the Chinese have borrowed this practice from the Hindu or *vice versa*. The Hindu conception is not attested by any passage in Sanskrit literature, but only by Ctesias and Aelian who state that drinking-vessels made from the horn of the unicorn safeguard from poison and various diseases. The belief is likewise absent among the Greeks and Romans, in whose records the number of references to rhinoceros-horn is exceedingly small (H. Blümner, Technologie und Terminologie der Gewerbe und Künste, Vol. II, p. 358). There is no evidence that the Chinese notions are due to any stimulus received from outside; they appear, on the contrary, as legitimate offshoots grown on Taoist soil. The Chinese likewise conceived the idea of carving rhinoceros-horn into cups, girdle-plaques, and fanciful ornaments. We shall come back to these various points in detail. Compare p. 154, note.

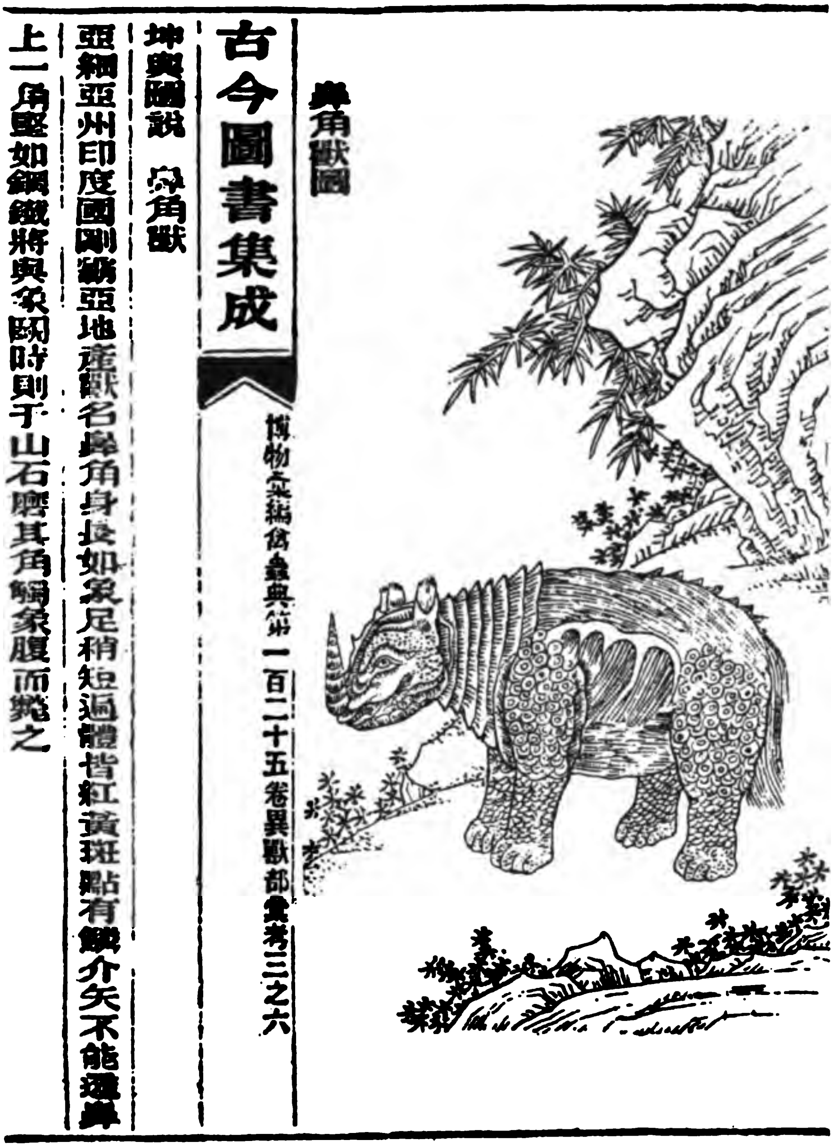


坤輿圖說　獨角獸

亞細亞州印度國產獨角獸形大如馬極輕快毛色黃頭有角長四五尺其色明作飲器能解毒角銳能觸大獅獅與之鬬避身樹後若悞觸樹木獅反嚙之

FIG. 1.

Monoceros of European Armorial Style, introduced into China by the Jesuit Father Ferdinand Verbiest (from *T'u shu tsi ch'êng*).



鼻角獸圖

古今圖書集成 博物彙編禽蟲典第一百二十五卷異獸部彙考三之六

坤輿圖說 鼻角獸

亞細亞州印度國剛霸亞地產獸名鼻角身長如象足稍短遍體皆紅黃斑點有鱗介矢不能透鼻上一角堅如鋼鐵將與象鬭時則于山石磨其角觸象腹而斃之

FIG. 2.

Rhinoceros, Design of European Origin, introduced into China by the Jesuit Father Ferdinand Verbiest (from *T'u shu tsi ch'ông*).

bovine animals,[1] with a single horn on the head. Says Mr. GILES, "The *Erh ya* says: the latter is like an ox, and the former like a pig, while the *Shan hai king* speaks of both as occurring in many parts of China. There is thus hopeless confusion, of which perhaps the explanation is that a term which originally meant a bovine animal was later on wrongly applied to the rhinoceros."

The first argument advanced by Mr. Giles is not admissible as good evidence in the case. "The rhinoceros is known to the Chinese as *pi kio*, 'nose-horn,' and is approximately figured in the *T'u shu.*" By referring to the Chinese cyclopædia we find, however, that this name with the illustration is extracted from the *K'un yü t'u shuo*. The latter is not the production of a Chinese author, but of the Jesuit FERDINAND VERBIEST, born in 1623, and who arrived in China in 1659 and died in 1688.[2] This section of the *T'u shu tsi ch'êng* alluded to by Mr. Giles and devoted to "strange animals" contains quite a number of illustrations and texts derived from the work of Verbiest; and neither his zoölogical nomenclature nor his descriptions and illustrations, which are based on European lore, can be laid at the door of the Chinese. The evidence is here produced in Figs. 1 and 2. In Fig. 1, Verbiest pictures a "single-horned animal" (*tu kio shou*), saying, "India, situated on the continent of Asia, is the habitat of the single-horned animal which is as big as a horse, very light and swift, and yellow in color. On its head it has a horn, four to five feet long, of bright color. It is made into drinking-vessels which are capable of neutralizing poison. As the horn is pointed, the animal can charge a big lion. The lion, while struggling with it, takes refuge behind a tree; and when missing its aim, it butts the tree, while the lion bites it at this moment." In Fig. 2, the *pi kio shou* referred to by Mr. Giles is pictured. Verbiest comments, "The locality Kang-pa-ya[3] in India, situated on the continent of Asia, is the habitat of an animal called 'nose-horn' [rendering of 'rhinoceros']. Its body is as powerful as that of the elephant, but its feet are somewhat shorter. Its trunk is covered all over with red and yellow spots, and is overlaid with scales. Arrows cannot pierce it. On its nose there is a single horn as strong as steel. It prepares for its battles with the elephant by whetting its horn on the rocks; and hitting the elephant's paunch, it kills it." The alleged combats of the rhinoceros with the lion and elephant are classical reminiscences (see p. 84) which are absent from Chinese folk-lore. Verbiest repeats the popular traditions current at his time in Europe, and like Cosmas Indicopleustes, still discriminates between the *monoceros* or *unicornis* (*tu kio*) and the *rhinoceros* (*pi kio*), illustrating the former by the unicorn of European heraldry. Consequently the terms employed by Verbiest are literal translations of European nomenclature into Chinese, made by Verbiest for his purpose; and the word *pi kio* cannot be claimed, as has been done by Mr. Giles, as a genuine term of the Chinese language. It is a foreign term not employed by the Chinese. Indeed, in a long series of Chinese texts dealing with the rhinoceros, and given below, not any use of this name is made. Only a single case is known to me: the Manchu-Chinese dictionary *Ts'ing wên pu hui* of 1786 (Ch. 4, p. 23) explains the Manchu word *sufen* by the said *pi kio*, adding the definition, "a strange animal bred in Cambaya in India, like an elephant, with short feet," etc., the same as given by Verbiest. This, accordingly, is a mere repetition of the latter's statement, and is not conclusive. Curiously enough, that expression which Mr. Giles credits as the only authentic word for "rhinoceros" is given a quite different meaning in the Polyglot Dictionary of K'ien-lung (Appendix, Ch. 4, p. 75), where we find the series Chin. *pi kio shou*, Manchu *sufen*, Tibetan *ba-men*, Mongol *bamin*. The Tibetan word *ba-men*, reflected in Marco Polo's *beyamini*,[1] denotes the gayal wild ox (*Bos gavaeus*). Whether this equation, as a matter of fact, is correct, is certainly a debatable question; but this point does not concern us here. The point to be brought out is that *pi kio* in the sense of "rhinoceros" is a term coined by Verbiest, and that it has not yet been pointed out in any Chinese text prior to his time.[2] Simultaneously Mr. Giles's argument directed against Hirth —"the *T'u shu* expressly says that arrows cannot pierce the hide of the rhinoceros"— falls to the ground. This is a verdict of Verbiest, and not to be encountered in any Chinese report regarding the rhinoceros. It is, moreover, an argument of no meaning and no value; it is simply a popular notion of fabulous character.

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[1] This is a debatable point. The two illustrations do not resemble bovine animals, but deer (see Figs. 9 and 10 on pp. 102 and 103). The "bovine animal with one horn" first appears in LIONEL GILES, An Alphabetical Index to the Chinese Encyclopaedia, p. 5 (London, 1911).

[2] WYLIE, Notes on Chinese Literature, p. 58; M. COURANT, Catalogue des livres chinois, p. 95; H. CORDIER, L'imprimerie sino-européenne en Chine, p. 59; P. PELLIOT *Bulletin de l'Ecole française d'Extrême-Orient*, Vol. III, 1903, pp. 109, 115.

[3] That is, Khambāyat or Cambay, in the western part of the province of Gujarāt.

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[1] See the writer's Chinese Pottery, p. 260, note 4.

[2] The general Chinese expression for rhinoceros-horn which is even now traded to Canton and there made into carvings is still *si kio;* hence it follows that at the present day the designation of the animal itself, as it has been for several millenniums, is the word *si*. The English and Chinese Standard Dictionary of the Commercial Press, issued by a commission of Chinese scholars, who must know their language, renders the word "rhinoceros" into *se niu* and *se* (Vol. II, p. 1919). COUVREUR (Dict. français-chinois, 2d ed.) has likewise *se niu*. DOOLITTLE (Hand-Book of the Chinese Language, Vol. I, p. 411) gives under "rhinoceros" *si*, *se niu*, and *si niu*. SCHLEGEL (Nederlandsch-chineesch Woordenboek, Vol. III, p. 622) renders the word by *se*, *si*, and *si niu*. True it is that in recent times the words *se* and *si* have been transferred to bovine animals, and the Chinese themselves are well aware of this fact. Thus Li Shi-chên, in his *Pên ts'ao kang mu*, remarks that the term "hairy rhinoceros" is *at present* referred to the yak (see p. 150). This, however, as will be established by abundant evidence, was not the case in former times. In fact, these recent adjustments prove nothing for conditions which obtained in earlier periods. The question as to how the word *se* became transferred to the buffalo is discussed on p. 161, note 5.

The numerous stories formerly current anent the rhinoceros chiefly culminated in three points,— its ferocity, the use of its horn as a weapon of attack, and its invulnerability. These notions have been refuted by close observation. We quote an authority, R. Lydekker:[1] "Fortunately, in spite of stories to the contrary, the creature in its wild state appears to be of a mild and harmless disposition,[2] seeking rather to escape from its enemies by flight than to rout them by attack. When badly wounded, or so hustled about by elephants and beaters as to become bewildered, a rhinoceros will, however, occasionally charge home. In such onslaughts it is the common belief that the animal, like its African cousins, uses its horn as its weapon of offence; but this is an error, the real weapons being the triangular, sharp-pointed low tusks." The same author states in another work[1] on the skin of the animal, "From the immense thickness and apparent toughness of its enormous folds, it was long considered that the hide of the Indian rhinoceros was bullet-proof, and that the only places where the animal was vulnerable were the joints of the armor. . . . As a matter of fact, the skin of the living animal is quite soft, and can readily be penetrated in any place by a bullet, or easily pierced by a hunting knife. When dried it becomes, however, exceedingly hard; and it was formerly employed by the Indian princes in the manufacture of shields for their soldiery."

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[1] The Game Animals of India, Burma, Malaya, and Tibet, p. 31 (London, 1907).

[2] Certainly; it is easily kept in confinement and tamed, and has often been transported over vast tracts of water and land. A good example of the overland transportation of a tamed rhinoceros or several animals is furnished by Se-ma Ts'ien, in the chapter on the Imperial Sacrifices to Heaven and Earth, when this animal together with an elephant was conducted as far as the foot of Mount T'ai in Shan-tung with a possible view to their being sacrificed; but the Emperor spared their lives, and the animals were allowed to return (see Chavannes, Les Mémoires historiques de Se-ma Ts'ien, Vol. III, p. 502). The following tributes of living rhinoceroses are on record. In the year 2 A.D. the country Huang-chi (south of Tonking, 30,000 *li* from the capital of China) sent a living rhinoceros as tribute to the Court of China, as mentioned three times in the *Ts'ien Han shu* (Ch. 27 B, p. 17 b). These texts have recently been studied by Paul Pelliot (*T'oung Pao*, 1912, pp. 457–460), who has revealed their fundamental importance for the history of Chinese relations with the countries of the Indian Ocean in the first century of our era. On the basis of Pelliot's translations, the country Huang-chi has recently been made the object of an interesting geographical study on the part of A. Herrmann (Ein alter Seeverkehr zwischen Abessinien und Süd-China bis zum Beginn unserer Zeitrechnung, *Zeitschrift der Gesellschaft für Erdkunde zu Berlin*, 1913, pp. 553–561). This author identifies Huang-chi with Abyssinia mainly on the ground that the rhinoceros occurs there. This argument is not cogent, since the home of the animal is in all parts of both Indias, Borneo, Java, and Sumatra as well. Also for other reasons this identification is unfortunate. The transportation of a live rhinoceros from Abyssinia to China over a maritime route would have been a feat impossible in those days, in view of the imperfect state of navigation, while it could easily have been accomplished, if Huang-chi, as assumed by me, was located on the Malayan Peninsula; and as shown by the Chinese records, the live rhinoceroses all hailed from Indo-China or Java. The name Huang-chi, moreover, cannot be derived from Aghāzi, as Herrmann thinks. His decisive argument in support of this theory is, of course, the statement in the Chinese text that Huang-chi is 30,000 *li* distant from Ch'ang-ngan, the then capital of China. Mr. Herrmann unreservedly accepts this as a fact, and is in this manner carried away to eastern Africa. We have known for a long time (in fact, the Jesuits of the eighteenth century knew it) that the Chinese definitions of distances over maritime routes must not be taken at their surface value. Nor have we any reason to be more Chinese in this respect than the Chinese themselves. The following is expressly stated in the *Sung shu*, the History of the Liu Sung Dynasty (420–478 A.D.; Ch. 91): "The southern and south-western barbarians, generally speaking, live to the south and south-west of Kiao-chi (northern Annam), and also inhabit the islands in the great ocean; the distance is about three to five thousand *li* for those that are nearer, and twenty to thirty thousand *li* for those that are farther away. When sailing in a vessel it is difficult to compute the length of the road, and therefore we must recollect that the number of *li*, given with respect to the barbarians of the outer countries, must not be taken as exact" (see Groeneveldt, in *Miscellaneous Papers relating to Indo-China*, Vol. I, p. 127). It is plainly indicated in this passage that the distances

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given for the routes in the southern ocean are not exact, and that a description of twenty to thirty thousand *li* is nothing but a convention to denote the very remote barbarians of the south. Compare, on Chinese calculations of sea-routes, particularly G. SCHLEGEL (*T'oung Pao*, Vol. III, 1892, pp. 161–5). In *Hou Han shu* (Ch. 116, p. 3 a) the location of Huang-chi is positively indicated as being south of Ji-nan (Tonking), which means that it was situated on the Malayan Peninsula. In 84 A.D. the *Man I* beyond the boundary of Ji-nan offered to the Court a living rhinoceros and a white pheasant (*Hou Han shu*, Ch. 116, p. 3 b). In 94 A.D. the tribes in the south-west of Sze-ch'uan sent an envoy and interpreter presenting a rhinoceros and a big elephant (*ibid.*, Ch. 116, p. 8 b). At the time of the Emperor Ling (168–188 A.D.) of the Later Han dynasty, Kiu-chên in Tonking despatched a living rhinoceros to the Chinese Court (*Huan yü ki*, and *Ta Ming i t'ung chi*, ed. of 1461, Ch. 90, fol. 5, where it is said also that at the time of the Yüan dynasty [1260–1367] Annam presented a rhinoceros). In 539 Fu-nan sent a live rhinoceros (*Liang shu*, Ch. 54, p. 4). A similar report in regard to the country of Ho-ling (Java) occurs in 819 A.D. at the time of the T'ang dynasty (*Kiu T'ang shu*, Ch. 197, p. 2 b). Finally the poets Yüan Chên (779–831; GILES, Biographical Dictionary, p. 964) and Po Kü-i have celebrated in verse a tame rhinoceros which had been sent as tribute in the year 796; it was housed in the Shang-lin palace, and an official was appointed to care for it; but in the winter of the following year when great cold set in, the poor creature died. In 1009 Kiao-chi (Annam) presented a tame rhinoceros to the Court (*Sung shi*, Ch. 489), and there are other similar reports by the essayists of the Sung period.—TAVERNIER (Travels in India, ed. V. BALL, Vol. I, p. 114) saw a rhinoceros eating stalks of millet presented to it by a small boy; encouraged by this sight, the traveller seized some stalks, and the rhinoceros at once approached him, opening its mouth four or five times; he placed some stalks in it, and when the animal had eaten them, it continued to open its mouth to receive some more. Tame rhinoceroses, to which a good deal of freedom was allowed, were formerly not uncommonly kept by the Rājas of India. Surely, not only men, but also animals, are usually better than their reputation among men. One of the most notable facts about the behavior of the rhinoceros in captivity, as already observed by DARWIN (The Variation of Animals and Plants under Domestication, Vol. II, p. 165, Murray's edition, 1905), is that under this condition it breeds in India far more readily than the elephant. The captive elephants, in contrast to the rhinoceros, as pointed out by Darwin and confirmed by others (E. HAHN, Kulturgeschichte der Haustiere, p. 37), but very rarely breed; as a rule, they do not even copulate. There is no doubt that the rhinoceros possesses the qualities fitting it for domestication, and that only the lack of promising advantages has prevented man from embarking on such a plan.

[1] The New Natural History, Vol. II, pp. 1055–1056.

Naturally the skin of the animal is as soft and sensitive as that of any other living creature, and arrows are certainly painful to it. Only when properly prepared and dried does the skin assume that iron-like hardness which has achieved its reputation and probably caused the fable of its being impenetrable in the live beast. The account of the Arab envoy given in 993 to the Chinese Emperor, that "to capture a rhinoceros, a man with a bow and arrow climbs a big tree, where he watches for the animal until he can shoot and kill it," as narrated by Chao Ju-kua, is entirely trustworthy.[1] The fable lies entirely in the "arrows cannot pierce the hide," to which Mr. Giles gives credence. When it is said, "he rips up a man with his horn," Chao Ju-kua simply accepts the belief of all his contemporaries, eastern and western; and the remark certainly proves that he speaks of the rhinoceros, while it is no argument in favor of Mr. Giles's opinion that the animal in question is not the rhinoceros.

While the general result at which Mr. Giles has arrived is not novel, being partly anticipated, as we have seen, by Biot, Palladius, and Couvreur, his arguments, as summed up above under No. 3, are original, and deserve serious consideration and discussion. What appears to Mr. Giles as the most weighty evidence in favor of his view are the queer Chinese illustrations of the two animals. Queer they are, but we must make an attempt at understanding and explaining them. For this reason, we shall first enter on a somewhat lengthy digression into the iconography of the rhinoceros; and it will be seen that this, as everything else connected with the animal, is an attractive subject of great culture-historical interest. It should be stated at the outset that the Chinese sketches pointed out by Mr. Giles, and other Chinese illustrations as well, can never have been intended for any bovines, whatever the alleged bovine character in the animal may be; for there is in this world no bovine animal with a single horn and three toes which, as will be shown, appear in the early Chinese definition, and are plainly outlined in the sketch of the rhinoceros said in the *Erh ya* to be of hog-like appearance (Fig. 6).[1] The single horn and the three toes, however, are thoroughly characteristic of the rhinoceros, and of this animal exclusively. But we are first going to study the psychology of the case.

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[1] The effect of arrows on the rhinoceros is well illustrated in the following story of Gaspar Correa, who went to India in 1512, and wrote a detailed chronicle of the Portuguese possessions there. He describes a battle of King Cacandar, who availed himself of elephants fighting with swords upon their tusks, and in front of them were arrayed eighty rhinoceroses (*gaṇḍas*) "carrying on their horns three-pronged iron weapons with which they fought very stoutly . . . and the Mogors with their arrows made a great discharge, wounding many of the elephants and the *gaṇḍas*, which as they felt the arrows, turned and fled, breaking up the battles" . . . (quoted by Yule and Burnell, Hobson-Jobson, p. 363). In India rhinoceroses were hunted with sabre, lance, and arrows. Timur killed on the frontier of Kashmir several rhinoceroses with sabre and lances, although this animal has such a hard skin that it can be pierced only by extraordinary efforts (Petis de la Croix, Histoire de Timur Bec, Vol. III, p. 159, quoted by Yule and Burnell, Hobson-Jobson, p. 762). In Baber's Memoirs (quoted *ibid.*) a rhinoceros-hunt is described in these words: "A she rhinoceros, that had whelps, came out, and fled along the plain; many arrows were shot at her, but . . . she gained cover." The hunters of Java hide sickle-shaped knives under the moss on steep mountain-paths; the animal, dragging its paunch almost close to the ground, rips up itself, and is then easily mastered (P. J. Veth, Java, Vol. III, p. 289, Haarlem, 1903). Hose and McDougall (The Pagan Tribes of Borneo, Vol. I, p. 145, London, 1912) have this observation to report: "Punans, who hunt without dogs (which in fact they do not possess), will lie in wait for the rhinoceros beside the track, along which he comes to his daily mud-bath, and drive a spear into his flank or shoulder; then, after hastily retiring, they track him through the jungle, until they come upon him again, and find an opportunity of driving in another spear or a poisoned dart through some weak spot of his armor."

On the first day of May of the year 1515 the first live rhinoceros was brought to modern Europe from India by Portuguese, and presented to King Emanuel of Portugal.[2] In commemoration of this event, Albrecht Dürer, who took a deep interest in exotic animals and people, sketched in the same year a likeness of this rhinoceros, published as a wood-engraving, with a somewhat lengthy description in German. Dürer's original drawing is still preserved in the British Museum (Plate IX).[3] It is so weak that, as already pointed out by Dr. PARSONS,[4] the first serious student of the anatomy of the rhinoceros, it is impossible to assume that he had ever seen the animal. This fact is quite certain, for it is known that the King of Portugal despatched the animal to the Pope, and that it was drowned off Genova when the vessel on board which it was being carried was foundered. The only supposition that remains, therefore, is that some one of Lisbon near King Emanuel must have sent on to Dürer a rough outline-sketch of the novel and curious creature, which was improved and somewhat adorned by the great artist. But to what sources did he turn for information on the subject? Naturally to that fountain-head from which all knowledge was drawn during that period, the authors of classical antiquity. The fact that Dürer really followed this procedure is evidenced by the very description of the animal, which he added to his sketch, and in which he reiterates the story of the ancients regarding the eternal enmity and struggle of rhinoceros and elephant.[1] The most curious feature about Dürer's rhinoceros is that, besides the horn on

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[1] See likewise Fig. 9, p. 102.

[2] The history of this event is narrated in the Decadas de Asia of J. DE BARROS (quoted by YULE and BURNELL, Hobson-Jobson, p. 363): "And in return for many rich presents which this Diogo Fernandez carried to the King, and besides others which the King sent to Affonso Alboquerque, there was an animal, the biggest which Nature has created after the elephant, and the great enemy of the latter . . . which the natives of the land of Cambaya, whence this one came, call Ganda, and the Greeks and Latins Rhinoceros. And Affonso d'Alboquerque sent this to the King Don Manuel, and it came to this Kingdom, and it was afterwards lost on its way to Rome, when the King sent it as a present to the Pope."

[3] I am indebted to Mr. Laurence Binyon of the British Museum for his courtesy in favoring me with a copy of this wood-engraving, from which our reproduction is made. The particulars of the history of this engraving are discussed by C. DODGSON (Catalogue of Early German and Flemish Woodcuts in the British Museum, Vol. I, p. 307, London, 1903).

[4] Die natürliche Historie des Nashorns, welche von Doctor PARSONS in einem Schreiben an MARTIN FOLKES, Rittern und Präsidenten der Königlich-Englischen Societät abgefasset, mit zuverlässigen Abbildungen versehen, und aus dem Englischen in das Deutsche übersezet worden von Doctor GEORG LEONHART HUTH, Nürnberg, bey Stein und Raspe, 1747. The English original of this interesting pamphlet of 16 pages in quarto is not known to me. It is accompanied by three plates engraved on copper representing the first fairly exact figures of the rhinoceros in various views, its horn and other organs of its body. An anonymous copper-engraving was published in 1748 under the title, "Vera effigies Rhinocerotis qui in Asia, et quidem in terris Mogolis Magni in regione Assam captus et anno 1741 tertio aetatis anno a capitano Douvemont van der Meer ex Bengala in Belgium translatus est." This rhinoceros, a three years old animal, was exhibited in Holland in 1741, and styled on the placards the *behemoth* of the Bible (JOB, 40) and the unicorn of mediæval times. It proved an overwhelming sensation. In 1747 it made its appearance at Leipzig where GELLERT set it a literary monument in the poem with the beginning, "In order to behold the rhinoceros, I was told by my friend, I resolved to stroll out." In

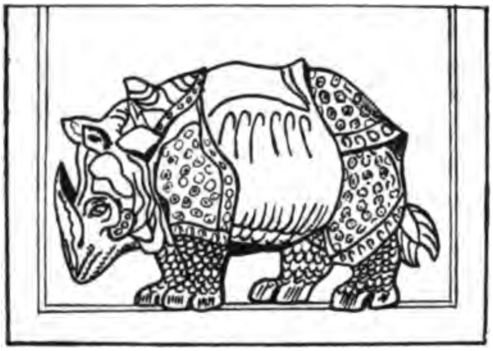

FIG. 8.

Marble Relief of Two-Horned Rhinoceros in Pompeii (from O. Keller, Antike Tierwelt).

1748 it reached Augsburg where Johann Ridinger made a drawing and etching of it with the title as stated (L. REINHARDT, Kulturgeschichte der Nutztiere, p. 751, München, 1912). The rhinoceros is a subject which for obvious reasons has seldom tempted an artist. It should be emphasized that no artist has ever made even a tolerably good sketch of it, and that only photography has done it full justice.

[1] According to the tales of the ancients, the feuds between the two animals were fought for the sake of watering-places and pastures; and the rhinoceros prepared itself for the combat by sharpening its horn on the rocks in order to better rip the arch-enemy's paunch which it knows to be its softest part (compare DIODOR, I, 36; AELIAN, *Nat. animalium*, XVII, 44; PAUSANIAS, IX, 21; and PLINY, *Nat. hist.*, VIII, 20: alter hic genitus hostis elephanto cornu ad saxa limato praeparat se pugnae, in dimicatione alvum maxime petens, quam scit esse molliorem). The same story is still repeated by JOHAN NEUHOF (Die Gesantschaft der Ost-Indischen Gesellschaft [1655–57], p. 349, Amsterdam, 1669) in his description of the Chinese rhinoceros, which is based on classical, not Chinese reports: "It makes permanent war on the elephant, and when ready to fight, it whets its horn on stones. In the struggle with the elephant it always hits toward its paunch where it is softest, and when it has opened a hole there, it desists, and allows it to bleed to death. It grunts like a hog; its flesh eaten by the Moors is so tough that only teeth of steel could bite it." The Brahmans allowed the flesh of the rhinoceros to be eaten as a medicine (M. CHAKRAVARTI, Animals in the Inscriptions of Piyadasi, *Memoirs As. Soc. of Bengal*, Vol. I, p. 371, Calcutta, 1906); according to al-Bērūnī (SACHAU, Alberuni's India, Vol. I, p. 204), they had the privilege of eating its flesh. CTESIAS stated wrongly that the flesh is so bitter that it is not eaten.

its nose, it is provided with another smaller horn on its neck. This proves that he must have read about a two-horned rhinoceros, for the specimen shipped to Portugal was the single-horned species of India. Martial, in one of his epigrams (*Spect. Ep.* XXII), has the verse, "*namque gravem gemino cornu sic extulit ursum.*" As long as the fact of a two-horned rhinoceros was not yet scientifically established,— and Dr. Parsons was one of the first to point it out,— the critics of Martial felt greatly embarrassed over the statement that a rhinoceros with double horn[1] should have lifted a bear, and arbitrarily changed the verse in various ways to get around the double horn. Dürer no doubt had this passage in mind, and accepted it as a fact. Nobody at that time, however, knew the location of the second horn: thus it found its place on the neck.[2] This case is very instructive, for the Chinese draughtsmen who had set before them the task of portraying a rhinoceros saw themselves in the same predicament as Dürer, in that they were lacking all personal experience of the animal, and for this reason were actuated by the same psychological factors. They, on their part, resorted to the classical definitions of the animal, as laid down in the ancient dictionaries *Erh ya* and *Shuo wên;* they did not intend to picture a rhinoceros true to nature and directly from nature, simply because they were deprived of this opportunity, but they composed and pieced together the creature from certain notions which they formed from bits of information gathered from their literary records. Whatever caricatures their achievements may be, however, there cannot be the slightest doubt that they intended to represent a rhinoceros, not some other animal. Dürer's work, from a scientific viewpoint, is in details highly inaccurate and untrue; the modern naturalist may even pronounce the verdict that what he represented is far from resembling a rhinoceros at all; but the bare fact remains — and this is the essential point — that the artist, as expressly stated in the legend by his own hand, had the intention of representing in this work a rhinoceros. As in most cases, the artist does not reproduce an object as it appears in the world of reality, but conveys to us his own notions of things as they are projected in his mind. Exactly as it happened in China, so Dürer's model found many adherents and followers, even among the naturalists who copied him again and again, and who surpassed him in fanciful additions of scales, wrinkles, and other decorations. Even BONTIUS,[1] who pretends that he saw the animal in exotic forests and stables, and boasts of furnishing a figure of it free from Dürer's defects, represents it, instead of with hoofs, with a paw very similar to that of a dog, only that it is somewhat larger.

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[1] The two-horned African rhinoceros is figured on the bronze coins of Emperor Domitian and on Alexandrian coins of the same emperor (Imhoof-Blumer and Keller, Tier- und Pflanzenbilder auf Münzen und Gemmen, Plate IV, 8), and unmistakably referred to by Pausanias (*l. c.*), who describes it as having the one horn on the extremity of its nose, the other, not very large, above the latter. The struggle between bear and rhinoceros is represented on a pottery lamp from Labicum, which is reproduced in Fig. 7 after O. Keller (Tiere des classischen Altertums, p. 118, Innsbruck, 1887), in order to illustrate the affinity of this creature with the "hog-like" rhinoceros of the Chinese (Fig. 6). Dürer's picture formerly led astray many a student of classical antiquity by giving the impression that a horn was really growing up from the animal's back. Thus S. Bochart, in his Hierozoicon (p. 931, Lugduni Batavorum, 1692), a learned treatise on the animals mentioned in the Bible, makes the following observation with reference to the verse of Martial above quoted: "Frustra etiam id observatur, Rhinocerotem geminum habere cornu. Alterum enim est in dorso, quo ursum extulisse dici non potest. Itaque ad illud cornu non pertinent haec poetae: gemino cornu sic extulit ursum." It was Bochart who proposed several conjectures tending to ameliorate Martial's text. Johannes Beckmann (De historia naturali veterum libellus primus, p. 129, Petropoli et Goettingae, 1766) was the first to point out emphatically the actual truth in the matter, in these words: "Sed non soli philologi, verum etiam physici duo cornua neglectis illis veterum locis [i.e., the passages of Martial and Pausanias] negarunt Rhinoceroti; uti Scheuchzerus, Peyerus. Consultius fuisset nec affirmare nec negare. Hodie enim auctoritatibus gravissimorum virorum satis probatum est, esse Rhinocerotes etiam bicornes, qui cornu alterum non in fronte, non in dorso, sed etiam in nare habent." In view of our subject, it is of especial interest to us to note that this truth was generally recognized in Europe as late as the latter part of the eighteenth century, while Chinese authors were well informed on the subject from the beginning of our era.

[2] It has recently been asserted (compare the notice of S. Reinach, *Revue archéologique*, 1913, p. 105) that the rhinoceros on a marble relief of Pompeii (Fig. 3; reproduced also by Reinach, Répertoire de reliefs, Vol. III, p. 93; and O. Keller, Die antike Tierwelt, Vol. I, p. 388) is an exact copy of the wood-engraving by Dürer and accordingly the work of a forger. This point of view seems to me inadmissible, and I concur with Reinach in the view that a common antique model may have been handed down by the illustrators of the bestiaries. The most striking coincidence between the rhinoceros of Pompeii and that of Dürer is the location of the second horn on the neck. This argument, however, is not cogent in establishing a close interdependence of the two; for also in China, on a picture of Yen Li-pên of the T'ang period (Fig. 11), the rhinoceros appears with a horn on its neck, and with scales on its body. As the artists all over the world were so much puzzled as to where to place the horn or horns, it is perfectly conceivable that Dürer, solely guided by his reading of ancient writers, even without having recourse to an antique pictorial representation, worked out his

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own theory in regard to the second horn. But it is desirable that, as suggested by Reinach, the iconographic question should be studied in detail. Neither should the differences between the two be overlooked. Dürer's posterior horn is directly behind the ears; in the Pompeiian picture it is far behind the ears, above the front legs; in the same spot Dürer has a small triangular point, the significance of which is not clear. It is certainly astonishing that the artists of Pompeii could commit this error, as the two-horned African rhinoceros was perfectly known in the Roman circus, and is correctly represented on the coins of Domitian mentioned above.—ULYSSES ALDROVANDUS (Quadrupedum omnium bisulcorum historia, p. 354, Francofurti, 1647) has the figure of a rhinoceros, with an additional horn in the shape of a corkscrew placed on the shoulders.

[1] JACOBI BONTII, Historiae naturalis et medicae Indiae Orientalis libri sex, p. 51 (Amsterdam, 1658). The horn is correctly drawn. Bontius avails himself of the word *abada*, which was used by old Spanish and Portuguese writers for a rhinoceros, and adopted by some of the older English narrators. The word is probably connected with Malayan *badak*, "rhinoceros" (see YULE and BURNELL, Hobson-Jobson, p. 1). In G. DE MENDOZA (Dell' historia del gran regno della China, 1586, p. 437) the word *abada* is identified with the rhinoceros.

Archæologists are agreed that the rhinoceros (Fig. 4)[1] is represented on the black obelisk of Salmanassar (B.C. 860–824) in company with an elephant, human-looking apes, and long-tailed monkeys. This tribute-picture suggests to I. KENNEDY[2] the first certain evidence of Babylonian intercourse with India. The animals formed part of the tribute of the Muẓri, an Armenian tribe living in the mountains to the north-east of Nineveh.[3] The rhinoceros is called in the inscription an "ox of the river Sakeya," and Kennedy criticises its representation as "very ugly and ill-drawn." Indeed, it is no more and no less than a bull, and, as far as natural truth is concerned, much inferior to the Chinese sketches. It even has cloven bull-feet, while one of the Chinese drawings has correctly three toes,[4] and the single clumsy horn rises on its forehead

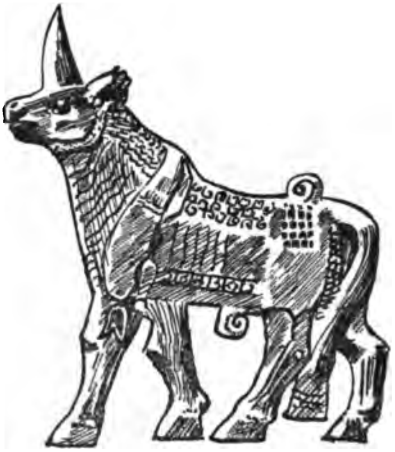

FIG. 4.
Rhinoceros from Obelisk of Salmanassar II (from O. Keller, Antike Tierwelt).

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[1] After O. KELLER, Die antike Tierwelt, Vol. I, p. 386 (Leipzig, 1909).

[2] The Early Commerce of Babylon with India (*Journal R. As. Soc.*, 1898, p. 259).

[3] According to J. MARQUART (Untersuchungen zur Geschichte von Eran, II, p. 101, Leipzig, 1905), who discusses the same passage in the inscription of Salmanassar II, Muzri is the name of a country and mountain-range (Muzūr Mountains) west of the Euphrates, and comprising also a part of the mountainous region south of the river. MARQUART translates "cattle of the river Irkea." Others, like Schrader, Hommel, and W. Max Müller (see B. MEISSNER, Assyrische Jagden, p. 20, Leipzig, 1911) identify Muzri with Egypt. KENNEDY does not explain how the rhinoceros could have gotten into that region from India; and it may have been, after all, an African species, although the single horn would rather point to India; the elephant, however, in his opinion, came over the passes of the Hindu Kush. There is, of course, the possibility that the lower Euphrates region may have harbored the rhinoceros, if we can depend upon the report of the *Hou Han shu* regarding the country of T'iao-chi (HIRTH, China and the Roman Orient, p. 38); and I am in full accord with what HIRTH remarks on this point in the preface (pp. X–XII). However this may be, I agree with KENNEDY, F. HOMMEL (Die Namen der Säugetiere bei den südsemitischen Völkern, p. 324), MEISSNER, and KELLER that the animal figured on the black obelisk of Salmanassar is intended for a rhinoceros, and not merely for an ox, for there is no ox with single horn as here represented. The Assyrian name for the rhinoceros is *kur-ki-za-an-nu = kurkizannu* (F. DELITZSCH, Assyrische Tiernamen, p. 56, Leipzig, 1874), which, according to HOMMEL (*l. c.*, p. 328), is a loan-word received from Ethiopic *karkand* (compare Arabic *karkadan*, Persian *kerk*). The trade-relations of India with Babylon are well established (see particularly G. BÜHLER, Indian Studies III, p. 84).

[4] The ancients did not notice this fact, nor did the Hindu, who classified the rhinoceros, owing to a confusion with the elephant, among the five-toed animals (M. CHAKRAVARTI, Animals in the Inscriptions of Piyadasi, *Memoirs As. Soc. Bengal*,

between the eyes, as it occurs in the armorial unicorns. It is very instructive to compare this Babylonian representation with those of the Chinese; and whoever will view them together will certainly grant attenuating circumstances to the latter. The Babylonian production is the more surprising, as the supposition is granted that the live animal was sent as tribute; and the "artist," we should think, had occasion to actually see it. The outcome is such a caricature, however, that this point of view seems impossible; the "artist" simply acted on hearsay, or had been instructed to represent a queer foreign animal of the appearance of an ox, but with only a single horn on its forehead. And here we are again landing right at the threshold of the psychology of the Chinese draughtsman who, most assuredly, had never throughout his life viewed any living specimen of a rhinoceros, but merely reconstructed it in a vision of his mind from what he had heard or read. Nevertheless his product is not what it may seem to us on the surface, but it is and remains what it is intended for, — the rhinoceros.

Another instructive example for the iconography of the rhinoceros is furnished by Cosmas Indicopleustes, the Egyptian monk and traveller of the sixth century A.D. COSMAS[1] discriminates between the unicorn (*monokeros*) and the "nose-horn" (*rhinokeros*), and has handed down to us sketches of both. In regard to the former, he remarks that he has not seen it, but that he had had occasion to notice four brazen figures of it set up in the four-towered palace of the King of Ethiopia, from which he was able to draw it. His figure[2] looks somewhat like a missing link between a horse and a giraffe, carrying on its head a straight, long horn. "In Ethiopia," Cosmas assures us, "I once saw a living rhinoceros from a great distance and saw also the skin of a dead one stuffed with chaff, standing in the royal palace, and thus I was able to draw it accurately." The result of this "accurate" drawing is the figure of a maned horse with bushy tail, with two horns planted upright on its nose.[3] Nobody, as far as I know, has as yet inferred from this figure that the Greek word *rhinokeros* relates to an equine animal and should be translated by "horse."

An interesting example of a Persian conception of the rhinoceros is depicted in the *Burlington Magazine*.[4] This is derived from an

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Vol. I, p. 371, Calcutta, 1906). In the commentary of Kuo P'o to the dictionary *Erh ya* (see below, p. 94) and in the *Kiao chou ki* of the fifth century A.D. it is clearly stated that the rhinoceros has three toes. Compare p. 95, note 6.

[1] Ed. MIGNE (*Patrologia*, Vol. 88), p. 442.

[2] Christian Topography, translated by MACCRINDLE, Plate IV, No. 28 (*Hakluyt Society*, 1897).

[3] *Ibid.*, No. 23.

[4] Vol. XXIII, July, 1913, Plate III.

illustrated "Description of Animals," the *Manafi-i-heiwan*, translated from Arabic into Persian and completed between 1295 and 1300. Here we have the interesting case that the author of this article, C. ANET, who evidently does not read Persian, mistakes the rhinoceros for "a horned gnu." But the picture is entitled in Persian *kerkeden* (or *kargadan*), "the rhinoceros," and it is therefore superfluous to discuss the point that it cannot represent a gnu.[1] Although the creature has the shape of an ox, exactly as on the Assyrian obelisk and in the Chinese woodcut (Fig. 5), with the additional hump of a zebu[2] and black antelope-like stripes on its body, it is unmistakably characterized by a single horn in the form of a crescent.[3]

In order to understand how the early Chinese illustrations of the rhinoceros alluded to by Mr. Giles were made, it is imperative to study the ancient definitions of the two words *se* and *si*. These definitions are sufficiently clear to place us on the right track in nicely discriminating between the two words, which plainly refer to two distinct species of rhinoceros. The weak point in Mr. Giles's definition of "bovine animal"[4] is that it is somewhat generalized, and leaves us entirely in the dark as to the difference between the two words *se* and *si*. They are physically differentiated words, and are expressed by different symbols in writing.

Se-ma Ts‘ien[5] mentions the two species of rhinoceros and elephant as inhabitants of the country of Shu (Sze-ch‘uan).[6] The commentator states, "The animal *se* is built like the water-buffalo. The elephant is a large animal with long trunk and tusks ten feet long; it is popularly styled 'river ape' (*kiang yüan*, No. 13,741). The animal *si* has a head resembling that of the ape *yüan* and a single horn on its forehead."[1]

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[1] A species of antelope restricted to Africa, which could hardly be expected in Persian art.

[2] This hints at the square-mouthed or white rhinoceros of Africa. One of the peculiarities of this species is the prominent, rounded, fleshy hump on the nape of the neck, just forward of the withers (E. HELLER, The White Rhinoceros, p. 20, Washington, 1913).

[3] A representation of the rhinoceros in sculpture is spoken of in a Persian description of the province of Fars from the beginning of the twelfth century; in Iṣṭakhr the portrait-statue of King Jamshīd was erected in stone, with his left hand grasping the neck of a lion, or else seizing a wild ass by the head, or again he is taking a unicorn (or rhinoceros) by the horn, while in his right hand he holds a hunting-knife, which he has plunged into the belly of the lion or unicorn (G. LE STRANGE, *Journal R. As. Soc.*, 1912, p. 27). In the Annals of the T‘ang Dynasty it is on record that in 746 A.D. Persia offered a rhinoceros and an elephant (CHAVANNES, *T‘oung Pao*, 1904, p. 76).

[4] What wild bovine animal should be understood has never been indicated.

[5] *Shi ki*, Ch. 117, pp. 3 b, 7 b.

[6] Our historians of Japan have been greatly puzzled by the fact that the Japanese Buddhist monk Tiao-jan (Japanese Chōnen), who came to China in 984, stated in his report embodied in *Sung shi* (Ch. 494, p. 4 b) that there were in his native country water-buffalo, donkeys, sheep, and plenty of — thus it has been translated — rhinoceroses and elephants (for example, by P. A. TSCHEPE, Japans Beziehungen zu China, p. 89, Yen-chou fu, 1907). O. NACHOD (Geschichte von Japan, Vol. I, p. 22) went so far as to appeal to a misunderstanding on the part of the Japanese informant, which he believes cannot be surprising, as Tiao-jan, though well versed in the written characters of the Chinese, did not understand their spoken language. This argu-

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mentation is entirely inadmissible. It is certain that neither rhinoceros nor elephant exists in Japan: consequently Tiao-jan, in using the expression *si siang* (Japanese *sai-zō*) cannot be understood to convey to it its literal meaning, but he is sure to employ it in a different sense. Chinese expressions (and Japanese are largely based on them) do not always mean what they seem to imply on the surface, but are often literary allusions or reminiscences of a metaphorical significance. The Japanese monk indeed avails himself of a Chinese phrase of classical origin traceable to *Mêng-tse* (Legge, Classics, Vol. II, p. 281), and in my opinion, simply means to say that Japan produces "extraordinary wild animals." Yen Shi-ku, defining the word *shou* ("wild animals") in the Annals of the Han (*Ts'ien Han shu*, Ch. 28 A, p. 4 b), explains it as embracing such kinds as rhinoceros and elephants, whence it follows that this compound *si siang* is capable of rendering the general notion of wild animals. *Si siang* has thus become a stereotyped term occurring in many authors, although the literal meaning usually remains, as, for example, in *Ts'ien Han shu* (Ch. 28 B, p. 17), *Erh ya* (see p. 94, note 3), *Nan shi* (Ch. 78, p. 7), *T'ang shu* (Chs. 43 A, p. 1, and 221 A, p. 10 b), and in the History of Shu (*Shu kien*) written by Kuo Yün-t'ao in 1236 (Ch. 10, p. 1, ed. of *Shou shan ko ts'ung shu*, Vol. 23). Hirth and Rockhill (Chau Ju-kua, p. 174) have taken a different view of the matter and suppose that the document utilized in the Sung Annals, and partially copied by Chao Ju-kua (inclusive of the statement that Japan produces *si siang*), contained a number of clerical errors; they are convinced that Tiao-jan's statement really was to the effect that there are neither rhinoceroses nor elephants in Japan. There is certainly no direct objection to be raised to such a point of view, but I am inclined to believe that with the indication as given there is no necessity of resorting to such a conjecture.

[1] This universal notion could have emanated only from the two-horned species with reference to the rear horn, which anatomically is indeed placed over the frontal bone, while the front horn is situated over the conjoined nasal bones (Flower and Lydekker, Introduction to the Study of Mammals, p. 403). The posterior horn immediately follows the anterior one, and is somewhat beneath the eyes. Curiously enough, this idea of the position of the horn on the forehead was transferred also to the single-horned species, and became a well-established tradition, which one author copied from another. It is found in the classical world as well as among the Arabic authors. Ctesias (ed. Baehr, p. 254) seems to be the most ancient writer in whom this tradition has crystallized: he describes the wild white asses of India as "having on the forehead a horn a cubit and a half in length." The fact that he speaks of the rhinoceros, above all, is evidenced by his reference to the horn being made into drinking-cups which were a preventive of poisoning (compare also Lassen, Indische Altertumskunde, Vol. II, p. 646). The *monoceros* of India, in the description of Pliny (*Nat. hist.*, viii, 21), had a single black horn projecting from its forehead, two cubits in length (*uno cornu nigro media fronte cubitorum duum eminente*). The horn of the rhinoceros sculptured in Assyria, as we have seen, is planted on its forehead. Of course, when describing a rhinoceros which he saw at the games in the circus, Pliny (viii, 20) states correctly that it has a single horn on its nose (*unius in nare cornus*); so does Aelian (xvii, 44), and so does likewise Kuo P'o. The Arabic merchant Soleiman, writing in 851 (M. Reinaud, Relation des voyages faits par les Arabes, Vol. I, p. 28), attributes to the rhinoceros of India a single horn in the middle of its forehead, and is duly seconded by his copyist Mas'ūdi (Ruska, *Der Islam*, Vol. IV, p. 164). Ibn al-Faqīh, describing the two-horned species of Africa, states that it has on its forehead a horn, by means of which it inflicts mortal wounds; and another minor one is beneath the former and placed between its eyes (E. Wiedemann, Zur Mineralogie im Islam, p. 250). Even al-Bērūnī (E. Sachau, Alberuni's India, Vol. I, p. 204), who imparts a sensible account of the Indian rhinoceros, asserts from hearsay that the African species has a conical horn on the skull, and a second and longer horn on the front. Early European observers also believed that the horn of the rhinoceros was growing on its forehead. Barker, as quoted by Yule

In the other passage, the definition of Kuo P'o (276–324), the editor of the dictionary *Erh ya*, is quoted.

The following definitions of the words *se* and *si* are given in the ancient dictionary *Shuo wên* (about 100 A.D.), and are here reproduced from an edition of this work printed in 1598, which is an exact facsimile reproduction of the Sung edition of the year 986. In all probability, this one faithfully mirrors the text of the original issue. The definition of *se* consists of only five words: "It is like a wild ox and dark-colored."[1] The character is then explained as a pictorial symbol (compare the reproduction of the Chinese text on p. 92).

It is doubtless on this enigmatic and incomplete definition that the explanations of Palladius and Couvreur (above, p. 74) are based. In order to reach a satisfactory result, however, it is always necessary to consult all records relating to a case; and it will always be unsafe to rely upon a single statement, which, after all, may have been curtailed, or incorrectly handed down. Let us note at the outset that the *Shuo wên* by no means says that the animal in question is a wild ox, but only that it is *like* one; a comparison with a wild ox is not yet proof of identity with it. Hing Ping (932–1010), the commentator of *Shuo wên*, annotates on the above passage as follows,—"Its skin is so strong and thick that armor can be made from it,"— and quotes the *Kiao chou ki*[2] to the effect that "the horn is over three feet long and shaped like the handle of a horse-whip."[3] The fact that this author means to speak of a single horn becomes evident from the statement of Kuo P'o to be cited presently.[4] The

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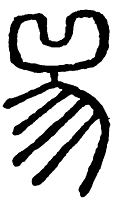
and Burnell (Hobson-Jobson, p. 1),wrote in 1592, "Now this Abath [*abada*, *bada* = rhinoceros] is a beast that hath one horne only in her forehead, and is thought to be the female Unicorne, and is highly esteemed of all the Moores in those parts as a most soveraigne remedie against poyson."

[1] K'ang-hi's Dictionary quotes the *Shuo wên* as saying that "the animal *se* has the shape or body of a wild ox and is dark-colored."

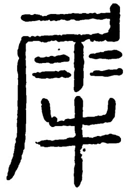
[2] Records of Annam, of the fourth or fifth century, by Liu Hin-k'i (Bretschneider, Bot. Sin., pt. 1, p. 159).

[3] In a somewhat different way, the *Shuo wên* is cited in *Yen kien lei han* (Ch. 430, p. 16 b), where original text and commentary are blended together: "The animal *se* resembles a wild ox and has a dark-colored skin which is so strong and thick that it can be worked up into armor. Among the animals on the mountain Po-chung, there is a large number of *se*." The latter name, according to Palladius, is an ancient designation for a mountain in the west of Shan-si. The fact that the rhinoceros should have occurred there in ancient times is not at all surprising (see the notes below on the distribution of the animal in ancient times). It is noteworthy that we meet here the reading, "it resembles a wild ox," in agreement with the wording of the *Erh ya*, whence it follows that the *se* was not straightway looked upon as a wild ox, but as something else; it was merely likened to it—a phraseology which is echoed in Babylonia and in the classical authors. This simile seems to account for the erroneous attempt of later commentators, like Chu Hi, to interpret *se* as identical with a wild ox.

[4] The *Kiao chou ki* is credited in the *Yen kien lei han* with the words, "The *se* has a single horn which is over *two* feet long and shaped like the handle of a horse-whip."



十六 如野牛而青象形與禽离頭同凡舄之屬皆从舄（徐姊切）



南徼外牛一角在鼻一角在頂似豕从牛尾聲先一切

animal *si* is defined in the *Shuo wên* as "an ox occurring beyond the southern frontier. It has a horn on its nose and another one on the crown of its head; it resembles a pig."[1] This definition fits no other animal than the two-horned species of rhinoceros, and has great historical value as a piece of evidence in determining the former geographical distribution of the species. The passage shows us that in the first century A.D. it no longer existed in northern China, where its habitat had been prior to that time, and that it was then driven back beyond the southern border, speaking roughly, south of the Yangtse. It was then naturalized in Yün-nan, in the country of the Ai-lao,[2] and in Tonking.[3]

To the author of *Kiao chou ki* we owe the following interesting description of the Annamese rhinoceros:[4] "The rhinoceros (*si*) has its habitat in the district of Kiu-tê (in Tonking). It has hair like swine, three toes, and a head like a horse. It is provided with *two* horns,—the horn on the nose being long, the horn on the forehead short." It is clearly manifest that this description comes from an eye-witness, or one well informed by the native hunters, and that it perfectly fits the two-horned so-called Sumatran rhinoceros (*Rhinoceros sumatrensis*), the only living Asiatic species with two horns, and also the most hairy one.[5] Its essential characteristics are well observed and briefly set forth in this definition.

The dictionary *Erh ya*, edited by Kuo P'o (276-324), defines the animal *se* as resembling the ox, and the animal *si* as resembling swine. The commentary by Kuo P'o explains that the *se* has a single horn, is dark in color, and weighs a thousand catties;[6] and "the *si* resembles in form the water-buffalo,[1] but has the head of a pig, a big paunch, short legs, and three toes on its feet; it is black in color and has three horns, one on the head, another on the forehead, and the third on the nose. The horn on the nose is the one by means of which it feeds [that is, uproots shrubs and trees];[2] it is small and not long; it likes to eat thorny brambles; there is also a kind with but a single horn." Kuo P'o, accordingly, is fully acquainted with the single-horned rhinoceros (his three-horned species is discussed farther on), and renders it plain enough that in his opinion neither the *se* nor the *si* is a bovine animal, as he treats them in a different section; while in his section on bovines, with twelve illustrations of such, no hint is made at *se* or *si*.[3] The last doubt which might still exist as to the acquaintance with the single-horned rhinoceros on the part of Kuo P'o and Hü Shên, the author of *Shuo wên*, will be banished by another word, *tuan*[4] (or *kio tuan*), of which *Shuo wên* (Ch. 11, p. 2) says that it is an animal of the shape of swine, with a horn which is good for making bows, and which is produced in the country Hu-siu.[5]

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[1] MARCO POLO (edition of YULE and CORDIER, Vol. II, p. 285) says regarding the rhinoceros of Java that its head resembles that of a boar.

[2] *Hou Han shu*, Ch. 116, p. 8 b.

[3] The question of the former geographical distribution of the rhinoceros in China is studied in detail below, pp. 159-166.

[4] *Yen kien lei han*, Ch. 340, p. 1. In Annamese the rhinoceros is called *hui* (written with the Chinese character for *se*) and *tây* or *tê* (written with the character for *si*).

[5] Hair grows sparsely all over the head and body, but attains its maximum development on the ears and the tail, its color varying from brown to black. The longest known specimen of the front horn is in the British Museum, and has a length of 32½ inches, with a basal girth of 17⅜ inches; a second specimen in the same collection measures 27⅛ inches in length, and 17⅛ in circumference (R. LYDEKKER, The Game Animals of India, p. 38). The statement of the *Kiao chou ki* that the horn is two or three feet long is therefore no exaggeration. Concerning the two horns in the *si*, there is consensus of opinion between that work and the *Shuo wên*.

[6] This may not be an exaggeration, though merely based on a rough estimate. The average weight of the rhinoceros, for reasons easy to comprehend, has never been ascertained. But if the weight of the skin alone may come to three hundred pounds (E. HELLER, The White Rhinoceros, p. 10), the complete animal may easily total a thousand and more. *K'ang-hi* and the modern editions of the *Erh ya* write "thousand

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catties." *Yen kien lei han* (*l. c.*) has the erroneous reading "ten," which is impossible. Also Chang Yü-si, the author of the *Pu chu pên ts'ao* of the year 1057, as may be seen from the *Chêng lei pên ts'ao*, quotes the *Erh ya* as saying that "the *se* resembles an ox and has a single horn." Kuo P'o, accordingly, concurs with Liu Hin-k'i in the view that *se* is the single-horned rhinoceros.

[1] *Yen kien lei han* (Ch. 430, p. 1) offers the variant, "The *si* resembles swine, but is in shape like an ox;" then the same text as above is given, but the clause in regard to the three horns is wanting.

[2] While feeding, the point of the horn of the animal may come in contact with the ground, so that the point is sometimes worn flat on its outer face (E. Heller, The White Rhinoceros, p. 31). According to Ibn al-Faqīh, the African rhinoceros tears herbage out with the anterior horn, and kills the lion with the posterior one (E. Wiedemann, Zur Mineralogie im Islam, p. 250).

[3] The rhinoceros is incidentally mentioned in another passage of *Erh ya* (Ch. B, fol. 29), where nine mountains with their famed productions are enumerated: "The finest productions of the southern region are the rhinoceros (*si*) and elephant of Mount Liang" (*Liang shan*, in Chung chou, Sze-ch'uan; Playfair, 2d ed., No. 3790, 2; Bretschneider, Bot. Sin., pt. 3, p. 575, No. 187). Kuo P'o adds, "The rhinoceros furnishes hide and horn, the elephant ivory and bones." It follows therefrom, as is also confirmed by other sources, that in the third century A.D., the lifetime of Kuo P'o, the rhinoceros still existed in Sze-ch'uan, as seen above; its existence was attested there by Se-ma Ts'ien several centuries earlier.

[4] Composed of the classifier *kio* ('horn') and the phonetic element *tuan* (No. 12,136). Not in Giles; see Palladius, Vol. I, p. 189. A unicorn is represented on the Han bas-reliefs (Chavannes, Mission archéologique, Vol. I, p. 60, Paris, 1913).

[5] Nos. 4930 and 4651. Other editions write Hu-lin. A horn bow is not a bow exclusively made from horn, which is technically impossible; but horn is only one of the substances entering into its manufacture. Technically the Chinese bow belongs to the class of composite bows, the production of which is a complicated process and requires a large amount of toil and dexterity. The foundation of the bow is formed of flexible wood connected with a bamboo staff. Along the back a thick layer of carefully soaked and prepared animal sinew is pressed, which, after drying, stiffens into a hard elastic substance. The inner side of the bow is then covered with two long horn sticks joining each other in the centre. The opposite of the horn bow is the wooden (or simple) bow (*mu kung*), as it is mentioned, for instance, as being used by

Kuo P'o states in regard to the same animal, "The horn is on the nose and capable of being made into bows. Li Ling presented ten such bows to Su Wu.[1] The animal mentioned in the Life of Se-ma Siang-ju in the *Shi ki* (Ch. 117) is the *k'i-lin*[2] *kio tuan*."

The animal with a horn on its nose is the single-horned rhinoceros; and the term *tuan* or *kio tuan* is a counterpart of the word *monoceros* of the ancients, as alluded to by Ctesias, Aristotle, Pliny, Aelian, and others, and which, according to the general consensus of opinion, relates to the one-horned rhinoceros of India. Bows manufactured from the horn are mentioned also in the Annals of the Kin Dynasty.[3] The allusion to armor by Hing Ping is additional proof for *se* being a rhinoceros, for, as we shall see, armor was not made in ancient China from the hides of bovine animals.[4]

It is beyond any doubt that in those various definitions there is plainly the question of a rhinoceros. We cannot get over the single horn, whether placed on the nose, the head, or the forehead;[5] we cannot get over the fact, either, that a conspicuous distinction between the single-horned (*se*) and two-horned (*si*) species is made, — a fact which will be discussed in full farther on when we have learned everything that Chinese authors have to report anent the two animals; nor can we get over the three toes which form a prominent characteristic of the rhinoceros,[6] but assuredly not of any bovine species. In fact, the Chinese definitions, without pretension to scientific accuracy, which could not be

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the populace of Tonking (*Ts'ien Han shu*, Ch. 28 B, p. 17), which in connection with it availed itself of flint, bamboo, and sometimes bone arrowheads.

[1] See GILES, Biographical Dictionary, pp. 450, 684.

[2] Regarding the *k'i-lin* see below, p. 113.

[3] *Kin shi*, Ch. 120, p. 3. Fossil rhinoceros-horn (from *Rhinoceros tichorrhinus*) is still employed by the Yakut in the manufacture of bows (B. ADLER, *Int. Archiv für Ethnographie*, Vol. XIV, 1901, p. 11).

[4] Regarding other Chinese notions of monoceroses see p. 114. Of later descriptions of the rhinoceros, the one contained in *Ying yai shêng lan* of 1416 by Ma Kuan is the most interesting. It is the most concise and correct definition ever given of the animal outside of our modern zoölogy. "The products of Champa are rhinoceros-horn and ivory of which there is a large quantity. The rhinoceros is like the water-buffalo. Animals of full growth weigh eight hundred catties. The body is hairless, black in color, and covered by a thick skin in the manner of a scale armor. The hoofs are provided with three toes. A single horn is placed on the extremity of the nose, the longest reaching almost fifteen inches. It subsists only on brambles, tree leaves and branches, and dried wood."

[5] As already remarked by CUVIER, the only real animal with a single horn is the rhinoceros.

[6] This statement reflects much credit on the observational power of the Chinese, especially as it is not pointed out by any classical author in describing the rhinoceros or unicorn. Al-Bêrûnî (SACHAU, Alberuni's India, Vol. I, p. 203) is the only early author outside of China to make the same observation. Al-Bêrûnî gives two different and contradictory descriptions of the rhinoceros, apparently emanating from two different sources. First, the animal is sensibly described from personal observation

expected, are perfectly sound and to the point in stating what a primitive observer could testify in regard to an animal so difficult of access and so difficult to describe. Surely, the Chinese definitions are not worse, and in several points perhaps better, than anything said about the animal in classical antiquity, among the Arabs, or in Europe up to the eighteenth century. And we shall soon recognize that until the very recent dawn of our scientific era the Chinese were the nation of the world which was best informed on the subject.[1] The Chinese likened the rhinoceros to the ox, the water-buffalo, the pig,[2] and its head to that of an ape.

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as follows: "The *gaṇḍa* exists in large numbers in India, more particularly about the Ganges. It is of the build of the buffalo [analogous to the Chinese definition], has a black scaly skin, and dewlaps hanging down under the chin. It has three yellow hoofs on each foot, the biggest one forward, the others on both sides. The tail is not long; the eyes lie low, farther down the cheek than is the case with all other animals. On the top of the nose there is a single horn which is bent upwards. The Brahmins have the privilege of eating the flesh of the *gaṇḍa*. I have myself witnessed how an elephant coming across a young *gaṇḍa* was attacked by it. The *gaṇḍa* wounded with its horn a forefoot of the elephant, and threw it down on its face." The other account of al-Bērūnī, which refers to the double-horned African species, is composed of the narrative of a man who had visited Sufāla in Africa, and of classical reminiscences freely intermingled with it; to the latter belong the beliefs in the mobility of the horn and in the sharpening of the horn against rocks, and here appears also the wrong notion that it has hoofs. — PLINY (*Nat. hist.*, VIII, 21, § 76) asserts that the single-horned oxen of India have solid hoofs (in India et boves solidis ungulis unicornes), a tradition which savors of the description of a unicorn after a sculpture (on the Assyrian obelisk the animal has bovine hoofs). Even ARISTOTLE (*Hist. an.*, II, 18; ed. of AUBERT and WIMMER, Vol. I, pp. 74, 254), who evidently speaks after Ctesias, characterizes the single-horned "Indian ass" as solid-hoofed (*μώνυχα*). This lacune in the descriptions of the ancients was aptly pointed out by BELIN DE BALLU (La chasse, poëme d'Oppien, p. 174, Strasbourg, 1787), who, in speaking of the familiarity of the ancients with the animal, concludes by saying, "Mais ce qui doit nous étonner c'est qu' aucun n'ait parlé d'un caractère particulier de cet animal, dont les pieds sont partagés en trois parties, revêtue chacune d'une sole semblable à celle du bœuf."

[1] The only reproach that can be made to the Chinese authors is that they never point to the peculiar skin-folds of the animal (with the only exception, perhaps, of Fan Chên of the Sung period, who describes the rhinoceros of Annam as "clad with a fleshy armor;" see p. 113), and that, despite the live specimens procured for the Imperial Court (p. 80), no attempt has ever been made at a more precise description based on actual observation. But we may address the same charge of omission to the authors of India, the Greek writers on India, and to Pliny and Aelian. PLINY is content with stating that he saw the animal in the Roman circus, but does not describe what he saw, while he is eager to reproduce all the fables regarding the monoceros, emanating from India or from former sources relative to India. AELIAN (*Nat. an.*, XVII, 44) thinks it superfluous to describe the form of the rhinoceros, since a great many Greeks and Romans have seen and clearly know it. In matters of description the animal presents as difficult a subject as in matters of art. Exact descriptions of it are due only to competent zoölogists of recent times.

[2] How very natural this comparison is, may be gleaned from the account contained in *Nan Yüe chi* (quoted in *T'u shu tsi ch'êng*, chapter on rhinoceros), that at the time of the Han a rhinoceros once stampeded from Kiao chi (Annam) into Kao-liang (the ancient name for Kao-chou fu in Kuang-tung Province), and that it was mistaken by the people for a black ox, while those acquainted with the animal asserted that it was a black rhinoceros. The resemblance of the rhinoceros to an ox or buffalo has indeed obtruded itself on the observers of all times; and this notion is so far from being restricted to the Chinese, that it may almost be called universal. As seen above (p. 87), the Assyrians called the animal "ox of the river Sakeya." PLINY (*Nat. hist.*,

This is all exceedingly good: it is simply the result of that mental process which classifies a novel experience under a well-known category,

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VIII, 21, § 72, 76) speaks of the unicorn oxen of India. Festus calls the African rhinoceros the Egyptian ox, and Pausanias tells of "Ethiopic bulls styled rhinoceroses" which he saw himself in Rome (O. Keller, Die antike Tierwelt, Vol. I, p. 385). The Indian physician Caraka, who lived at the Court of King Kanishka in Kashmir, placed the rhinoceros in the class of buffalo (*anūpa*, *Mem. As. Soc. Bengal*, Vol. I, 1906, p. 371). The Arabic merchant Soleiman, who wrote in 851, compared the Indian rhinoceros with the buffalo (M. Reinaud, Relation des voyages, Vol. I, p. 29); and so did, as seen above, al-Bērūnī. Ibn al-Faqīh says regarding the African rhinoceros that it resembles a calf (E. Wiedemann, Zur Mineralogie im Islam, p. 250). The Talmud, in three passages, mentions the one-horned ox as an animal sacrificed by Adam (L. Lewysohn, Die Zoologie des Talmuds, p. 151, Frankfurt, 1858). The "sea-ox" mentioned by Leo Africanus (Hirth and Rockhill, Chau Ju-kua, p. 145) certainly is the rhinoceros. The Malays designate the two-horned species *badak-karbau*, "the buffalo-rhinoceros," and the single-horned species *badak-gājah*, "the elephant-rhinoceros." It is difficult to understand, however, why some of the classical authors allude to the rhinoceros under the designation "the Indian ass" (Aristotle, *Hist. an.*, II, 18, ed. of Aubert and Wimmer, Vol. I, pp. 74, 254). Aristotle's definition is traceable to Ctesias (ed. Baehr, p. 254), who states that there were in India wild white asses celebrated for their swiftness of foot, having on the forehead a horn a cubit and a half in length, and that they are colored white, red, and black; from the horn were made drinking-cups which were a preventive of poisoning (compare also Lassen, Indische Altertumskunde, Vol. II, p. 646). The mention of these antipoisonous cups is good evidence for the fact that Ctesias hints at the Indian rhinoceros (Herodotus, IV, 191, speaks of horned asses of Libya, but they are not one-horned). Ctesias is an author difficult to judge. His account of India, said to have been written in B.C. 389, it should be borne in mind, was derived second-hand, while he resided in Persia as court-physician of King Artaxerxes Mnemon, so that his data may partially be based on Persian accounts of India, and misunderstandings of his informants may have crept in; moreover, his report is handed down in a bad and fragmentary condition, and may have been disfigured by Photias of Byzance of the ninth century, to whom the preservation of his work is due. The definition of Ctesias in the present case cannot be regarded as correct, as we do not find in India, or anywhere else in the East, a comparison of the rhinoceros with an ass, nor any tradition to this effect,— a tradition which is not likely ever to have existed. If the ass really was contained in his original text, it must go back, in my estimation, to a misunderstanding on his part of the word imparted to him by the authorities whom he questioned. With the exception of the horn, Ctesias does not seem to have entertained any clear notion of the animal; and his description of the skin as white, red, and black, is baffling. V. Ball (*Proceedings Royal Irish Academy*, Vol. II, 1885, and in his edition of Tavernier's Travels in India, Vol. I, p. 114) tried to show that the colors seen by Ctesias were artificial pigments applied to the hide, as they are on elephants at the present day; rhinoceroses kept by the Rājas for fighting-purposes were, according to him, commonly painted with diverse bright colors. This forced explanation, shifting quite recent affairs to the days of early antiquity, is hardly plausible. It seems to me that we are bound to assume that the text of this passage is not correctly handed down. The colors white, red, and black would seem rather to have originally adhered to the horn. The Eastern lore of the rhinoceros, as shown by the reports of the Chinese and Arabs, essentially clusters around the horn.— Marco Polo (ed. of Yule and Cordier, Vol. II, p. 285) says in regard to the Javanese rhinoceros that its head resembles that of a wild boar; and this characterization is quite to the point, as is that of Kuo P'o when he compares the two-horned *si* to swine. A glance at Fig. 8, representing the specimen of a Sumatran two-horned rhinoceros in the Field Museum, will convince every one of the appropriateness of this simile. The pig shape of the rhinoceros is apparent also in a Roman representation on a clay lamp from Labicum illustrating the struggle between that animal and a bear (Fig. 7), so that even the most skeptic critic of Chinese animal sketches will be compelled to grant a certain foundation of fact to the hog-like rhinoceros of the *Erh ya* (Fig. 6).

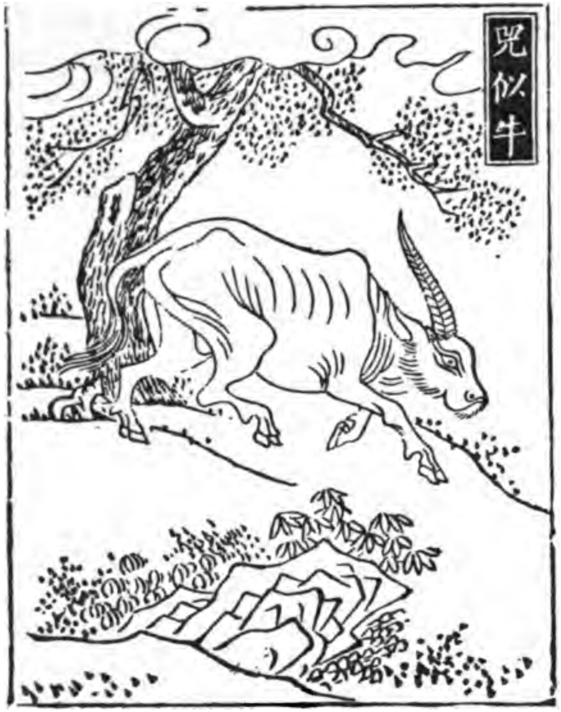

FIG. 5.
The Animal "*se* resembling the Ox" (from the Illustrated Edition of *Erh ya*).

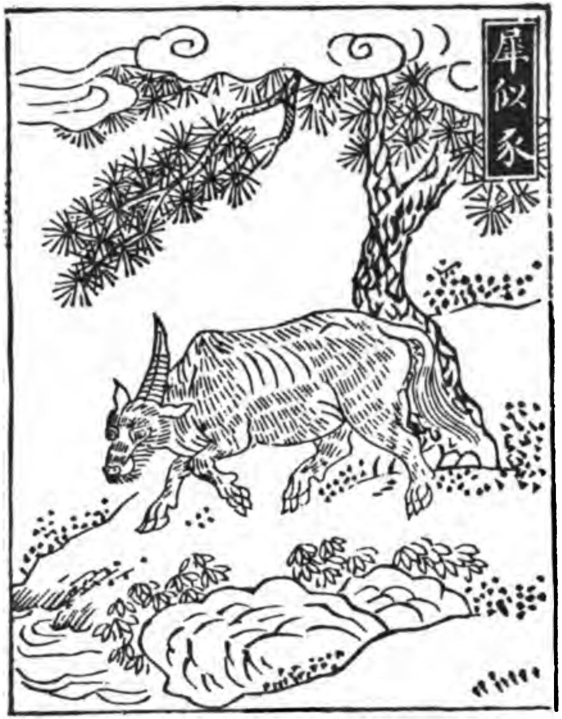

FIG. 6.
The Animal "*si* resembling Swine" (from the Illustrated Edition of *Erh ya*).

and the comparisons could not be any better. We should halt a moment to reflect by what class of people these observations had been made. Most certainly by the hardy hunters who chased the wild beasts. We must distinguish between the original observer and story-teller, and the scholar closeted in his study who draughted the definitions for the consumption of the learned. It was not the Chinese philologist who went out into the jungle to study the rhinoceros; he, indeed, never had occasion to see it, but he derived his knowledge from reports made to him by the sportsman. The latter probably was plain and matter-of-fact; the former added a bit of romance and exaggeration. Have we any right to ridicule the Chinese over their embarrassment as to where to locate the horn or the horns, when we observe that this was still a matter of wild speculation amidst Europe in the seventeenth and eighteenth centuries?[1]

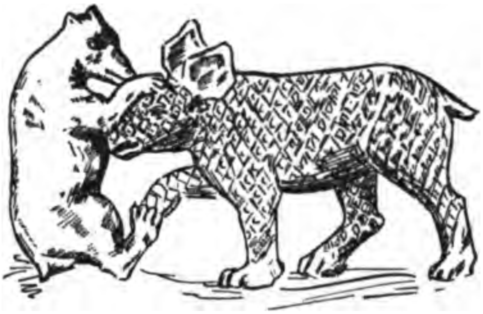

FIG. 7.

Struggle of Bear and Rhinoceros, represented on a Clay Lamp from Labicum (after O. Keller, Tiere des classischen Altertums).

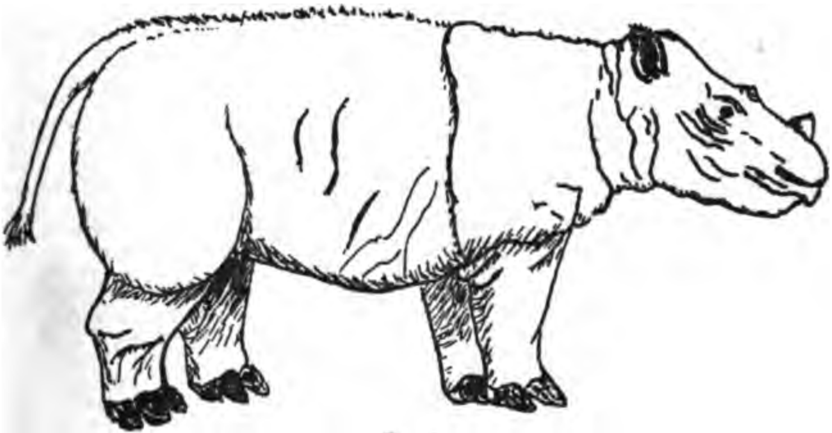

FIG. 8.

Sumatran Rhinoceros, Sketch from Museum Specimen (compare Elliot, Catalogue of the Collection of Mammals, Zoöl. Series, Vol. VIII, p. 105).

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[1] Dr. PARSONS, in the pamphlet quoted, justly remarks, "Nothing could serve as a better proof of how easily men may fall into uncertainty through preconceived conclusions than this very topic of the horn of the rhinoceros."

Have we any right to look down upon their artists in their naive attempts to sketch the rhinoceros in the shape of an ox with a horn on the forehead (Fig. 5), when we observe that the so-called "civilization" of Assyria and the painting of Persia committed the same error, or when we glance at the puerile drawings of Cosmas and recall Dürer's work with the horn on the animal's neck?

In the above definitions we recognize the elements and tools with which the subsequent Chinese illustrators worked. They set out to illustrate, not the rhinoceros, but the descriptions given of it in the ancient dictionaries. They studied, not the animal, but the ready-made definitions of it encountered in book-knowledge. They read, and their reading guided the strokes of their brush. "The *se* resembles in body a water-buffalo, the *si* a pig:" consequently such bodies were outlined by the illustrator of *Erh ya;* and long, curved, and pointed single horns were placed on the heads (Figs. 5 and 6).[1] He apparently shunned the three horns, as the matter was difficult to draw; and nobody knew how to arrange them. He carefully outlined the three toes in the animal *si;* and this feature, combined with the single horns, is sufficient flavor of the rhinoceros to guard from any rash conclusion even one who has not considered the psychological foundation of these sketches.

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[1] Our illustrations are derived from a folio edition of the *Erh ya* printed in 1801 (3 vols.), which is designated as "a reproduction of the illustrated *Erh ya* of the Sung period" (*Ying Sung ch'ao hui t'u Erh ya*). The ancient illustrations of the *Erh ya* by Kuo P'o and Kiang Kuan are lost (see BRETSCHNEIDER, Bot. Sin., pt. 1, p. 34), and were renewed in the age of the Sung, presumably without any tradition connecting the latter with the former. This fact may account for the purely reconstructive work of some illustrations, and we may well assume that the earlier sketches were far better. Many other illustrations of the *Erh ya* have been brought about in the same manner as those of the rhinoceros. Compare, for instance, the picture of the fabulous horse *po* (No. 9393) surrounded by flamed fluttering bands and about to lacerate a tiger seized by its carnivora-like, sharp claws; while a panther is swiftly making for safety to escape a similar fate. Of course, the craftsman has never observed this scene, but faithfully depicts the definition of the book, "The animal *po* is like a horse with powerful teeth, devouring tigers and panthers." This notion, as indicated by Kuo P'o, goes back to the *Shan hai king*, which says, "There is a wild animal styled *po*, like a white horse with black tail and powerful teeth, emitting sounds like a drum and devouring tigers and panthers." (Here we have a parallel to, and presumably an echo of, the flesh-eating horses of Diomed and the man-devouring Bucephalus of the Alexander legend; see J. v. NEGELEIN, Das Pferd im arischen Altertum, pp. 43, 75, Königsberg, 1903.) Otherwise the horses pictured in the *Erh ya*, aside from their technical drawbacks, are quite realistic; and so are the oxen and other animals which came under the every-day observation of the Chinese. It is still a mystery, and a problem worth while investigating, why the Chinese were rather good at drawing some animals and completely failed in others. It may be pointed out that the tapir of the *Erh ya*, aside from the exaggerated trunk and wrong tail, is rather correctly outlined with its white saddle, and corresponds to a well-known species (*Tapirus indicus*). In view of the retrospective and reconstructive sketches of this work, we have the same state of affairs as in the illustrations accompanying the *Shan hai king*, and as formerly shown by me in *Jade*, in the *San li t'u*, and to a certain extent in the *Ku yü t'u p'u*. The illustrators of the ancient Rituals did not directly picture the actual, ancient ceremonial objects, most of which were lost past hope in their time, but reconstructed them from the descriptions supplied by the commentators of the ancient texts, and for better or worse, based their illustrations on these artificial reconstructions, which to a large extent are erroneous or imaginary.

From the fact that the animal *se* is drawn in the shape of an ox, Mr. Giles infers that the word *se* does not denote the rhinoceros, but "a bovine animal." Then, how about the word *si?* The animal *si* (Fig. 6) is undeniably represented in the *Erh ya t'u* with the body of a hog,— why not, to be consistent, also translate the word *si* by "swine"? If a child who was invited to make a sketch of a whale should delineate it in the shape of a fish, should we conclude for this reason that the whale is a fish? To make use of an illustration for a far-reaching philological and zoölogical conclusion, it is indispensable to ascertain the real value of such an illustration, and to make a somewhat critical study of its origin and basis. Mr. Giles is right in stating that there are illustrations of the animal *se* that are purely those of an ox. The ill-reputed *San li t'u,* for instance, stooped to this wisdom when the difficult task arose of illustrating in the shape of a rhinoceros the target used by the lords and ministers in the practice of archery, and spoken of in the *Chou li* and *I li.* But what wonder! Those illustrators who employed the pure-ox design simply stood on the platform of the sober and incomplete definition of the *Shuo wên,* "The animal *se* is like a wild ox." Nothing could be more convenient to the unthinking and mechanical craftsman; this plain recipe freed him from the responsibility for the horn. Anybody could outline an ox with two regular horns; and by inscribing it *se,* the satisfaction at this achievement was naturally the greater.

It is incorrect, however, to say that the animal *se,* as outlined in *T'u shu tsi ch'êng* (Fig. 9), is the picture of an ox. In its general features it resembles a kind of deer, as does likewise the animal *si* (Fig. 10). A lengthy discussion of the "deer-like" rhinoceros follows below (p. 109). Again, in Fig. 9, the draughtsman has taken particular pains to set off distinctly three toes in the left front foot; and where is the bovine animal with three toes? And where is the bovine animal with a single horn, and with this peculiar shape of horn? As to Fig. 10, it presents itself as an illustration of the legend that, while the rhinoceros is gazing at the moon, the peculiar designs within its horn are formed (p. 147). This notion exclusively refers to rhinoceros-horn, so that the animal here intended can be no other than the rhinoceros.[1]

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[1] The two illustrations of *T'u shu tsi ch'êng* are derived, with a few slight alterations, from *San ts'ai t'u hui* (section on Animals, Ch. 3, p. 7; Ch. 4, p. 12), where, curi-

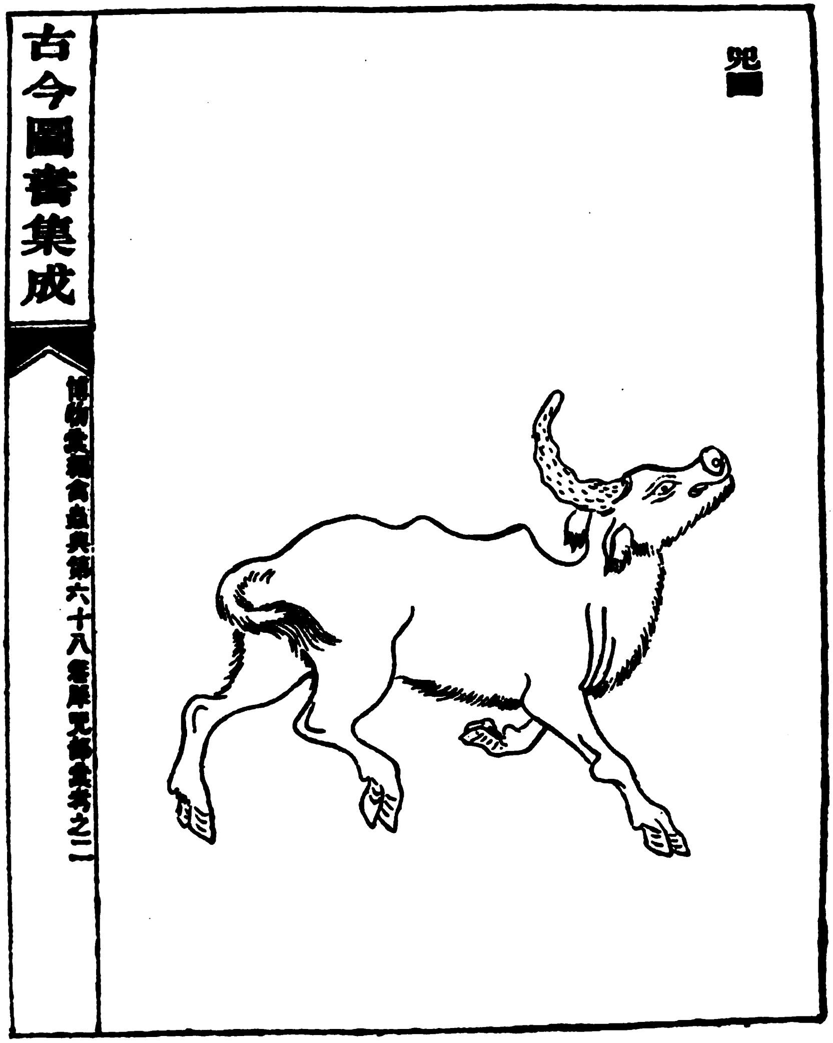
古今圖書集成
博物彙編禽蟲典第六十八卷犀兕部彙考之二
兕圖

FIG. 9.
The Animal *se* (from *T'u shu tsi ch'êng*).

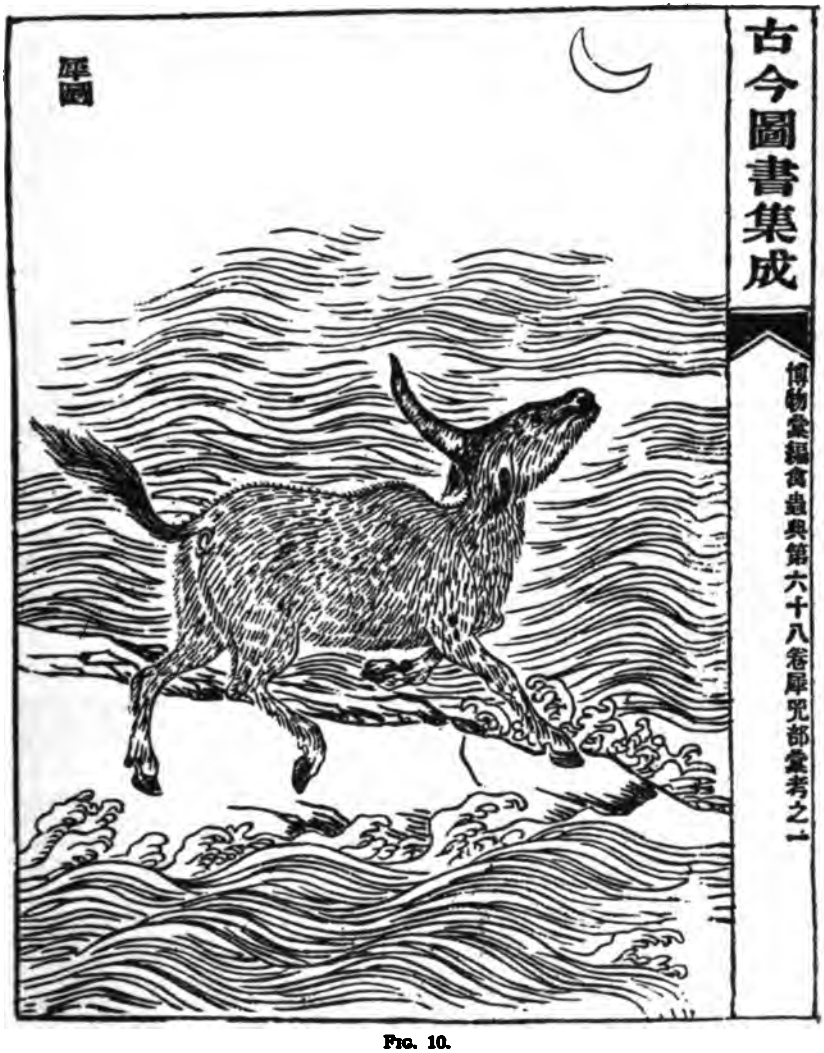
古今圖書集成
博物彙編禽蟲典第六十八卷犀兕部彙考之一
犀圖

FIG. 10.
The Animal *si* gazing at the Moon (from *T'u shu tsi ch'êng*).

The three-horned rhinoceros described by Kuo P‘o is perhaps not so fabulous as it may appear at first sight; for it is known to naturalists that the animal has also the tendency of developing three horns. E. HELLER[1] states in regard to the black rhinoceros covering the whole of Africa with the exception of the Congo Basin that, although the species is almost invariably two-horned, occasional variations of one and *three-horned* specimens are met with. In the light of this observation, PLINY's (*Nat. hist.*, VIII, 21) notice of oxen of India, some with one horn, and others with three (Indicos boves unicornes tricornesque), is apt to lose much of the legendary character with which it was formerly charged. As far as I know, a three-horned specimen has not yet been pointed out among the species of the Indo-Malayan region; notwithstanding, the possibility remains that such may have occurred in times of antiquity. However this may be, whether we assume that the notion of a three-horned species was founded on a natural observation or not, the fact of the coincidence between Kuo P‘o and Pliny remains, and hints at the existence of a tradition anent a three-horned variety in the beginning of our era.[2] At any rate, whether real or imaginary, the latter is but a variation of the two-horned species; and by omitting Kuo P‘o's illusory "horn on the head," we arrive at a fairly accurate description of it, and then Kuo P‘o exactly agrees with Hü Shên's definition of the word *si*. And there can be no doubt of the point that

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ously enough, they are separated and dispersed in two different chapters. In the latter work, the horn of the *se* is decorated with different designs, which are white on black, while they are black on white in *T‘u shu*. The *si* of *San ts‘ai* is adorned with flamed and fluttering bands, and the crescent of the moon is absent.

[1] The White Rhinoceros, p. 35 (Washington, 1913). Again on p. 17: "The number of dermal horns on the snout is of less importance. These have been found to show some individual variation in the African species varying from one to three in number in the same species. The front horn, however, is nearly always the better developed and is never wanting."

[2] The case could certainly be argued also from a purely philological point of view. Kuo P‘o's creation might be explained as an ill-advised combination of the single-horned and two-horned species, or even regarded as a subsequent interpolation in his text, due to a scribe who meant to be sure of his definition being as complete as possible. Pliny's *tricornis* might be rationally interpreted as the result of an arithmetical process, providing the rhinoceros as a species of ox with two bovine horns, and adding the nose-horn as the third. In this manner Damīrī's three-horned rhinoceros must have arisen (RUSKA, *Der Islam*, Vol. IV, 1913, p. 164), for it has one horn between the eyes and two above the ears. The natural explanation based on zoölogical observation appeals to me to a much higher degree, for we must not be forgetful of the fact that it is impossible for the human mind to invent spontaneously such an observation; a feature of this kind, in order to be observed by man, must have somehow pre-existed in nature. It means nothing, of course, to say that the three horns are a fable; if fable it is, then how did the fable come into existence? It is not the question of a mythological conception, or of a mythical monster, but plainly of a really existing animal described in sober words. I feel confident that the three-horned variation in a living or extinct species will be found some day also in Eastern Asia.

what Kuo P'o intends to describe is the two-horned species of rhinoceros, not any other animal: his statement in regard to "the horn on the nose" excludes any other idea, and the bovine animal with such a horn remains as yet to be discovered. Li Shi-chên of the sixteenth century, as will be seen below (p. 150), rejects the definition of Kuo P'o as erroneous; that is to say, he did not know of any three-horned variety, and recognized in it the two-horned species. An illustration of this three-horned creature may be viewed in the *Wa-Kan San-sai-zu-e*, the Japanese edition of the Chinese cyclopædia *San ts'ai t'u hui*.[1] The definition runs thus: "The rhinoceros has the hair of swine and three toes on each foot; it has the head of a horse and three horns, on the nose, the forehead, and on the skull, respectively." The three toes and three horns are exactly drawn in accordance with this prescription; curiously enough, however, the head is not that of a horse, but of a bull. The old tradition of the draughtsmen is retained in spite of the definition.

Kuo P'o, in all probability, is not the first or the only author to speak of a three-horned variety. A work *Kiao Kuang chi*,[2] Account of Kiao chou (northern part of what is now Annam) and Kuang-tung, reports, "In the territory of the Barbarians of the South-west occurs a strange rhinoceros with three horns emitting light at night like big torches at a distance of a thousand paces. When it sheds its horns, it hides them in a remote and dense jungle to prevent men from seeing them. The sovereigns hold this strange product in high esteem, and make it into hair-pins. These are capable of checking evil and rebellion." Here we have the testimony of an eye-witness or one reproducing a hearsay account; and, quite correctly, he points out this variety as a freak of nature. The exact date of the work in question is unfortunately not known to me; but as the quotation is placed between one from *Kuang-chi* by Ku Yi-kung, who according to Bretschneider[3] belonged to the Liang dynasty (502–556), and one from *Kuang chou ki*, a work of the Tsin period (265–419), the inference may be justifiable that *Kiao Kuang chi* likewise is a production of the Leu-ch'ao period. However remote from truth all these Chinese illustrations may be, most of them are fairly correct as to the outlines of the horn, naturally because the horn as an article of trade was always known, but not the animal itself.[1]

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[1] The illustration is easily accessible in L. Serrurier, Encyclopédie japonaise, le chapitre des quadrupèdes, Plate VIII (Leiden, 1875). This cut is not contained in a recent edition of this Japanese work (Tōkyō, 1906), but is replaced by a rhinoceros with two horns, the one on the forehead, the other on top of the skull. These attempts clearly prove that Japanese as well as Chinese illustrators did not draw the animal from life, but from the definitions of the books. In the Chinese *San ts'ai t'u hui* (Ch. 4, p. 32) only a three-horned animal (*san kio shou*) is depicted.

[2] Quoted in the chapter on Rhinoceros in *T'u shu tsi ch'êng*.

[3] Bot. Sin., pt. 1, p. 164.

The rôle played by the rhinoceros in Chinese art is limited. As shown by the symbol illustrated in the *Po ku t'u lu* (Fig. 18), it was pictured in early antiquity; and other representations of that period mentioned in Chinese records are discussed on p. 160. The animal lacks those æsthetic qualities of form which tempt the brush of the painter; and this may be the reason why despite the living rhinoceroses sent up as tribute to the capital (see p. 80) it has never been immortalized on any Chinese scroll known to us.[2] There is, however, one case on record. Chang Shi-nan, who wrote the book *Yu huan ki wên* early in the thirteenth century,[3] narrates that he once saw in Sze-ch'uan (Shu) the painting of an unknown artist showing the outlines of a rhinoceros with a horn on its nose.[4] The inhabitants of Sze-ch'uan, accordingly, were familiar with the animal, and for this reason represented it correctly. On some Buddhist pictures it may owe its existence to a mere lucky chance; that is, to the fact that it was so copied from an Indian-Buddhist model. On Yen Li-pên's picture showing Samantabhadra's elephant,[5] the rhinoceros is unmistakably contrasted with the elephant as the smaller animal with scaly body, and head surmounted by a single horn. Another illustration of the same subject is reproduced in Fig. 11 from *Ch'êng shi mo yüan* (Ch. 6 B, p. 16) published in the Wan-li period, after 1605. Possibly it occurs also on the later typical paintings of Buddha's Nirvāṇa in the group of wailing animals.[6] On the sculptures of Angkor-Vat the rhinoceros is represented as the vehicle of the god Kārttikeya.[7]

The Mongol emperors made practical use of the typical, conventional designs of the rhinoceros on the standards of the army: there was a standard with the picture of the animal *se*, "resembling an ox, with a single horn, and of dark color," and another with a picture of the

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[1] A modern Chinese school-book published at Shanghai in 1901, and illustrated by Wu Tse-ch'êng of Su-chou, illustrates the word *si* with the cut of a rhinoceros of European origin, and the word *se* with a jovial ox of his own invention; while the text accompanying it, imbued with the spirit of the *Shuo wên* and *Erh ya*, speaks of one horn on the nose and three toes.

[2] It is likewise absent from classical Greek art. The marble relief of Pompeii, the lamp from Labicum, and the coins of Domitian referred to, are the only known examples of its representation in late Roman art.

[3] WYLIE, Notes, p. 165.

[4] The text is reprinted in *T'u shu tsi ch'êng*, chapter on rhinoceros, *hui k'ao*, p. 5.

[5] Reproduced in the writer's *Jade*, p. 342.

[6] See for example A. GRÜNWEDEL, Buddhistische Kunst in Indien, p. 114, or Buddhist Art in India, p. 124 (in the right lower corner).

[7] According to M. G. COEDÈS, Les bas-reliefs d'Angkor-Vat, p. 12 (Paris, 1911).

掃象圖

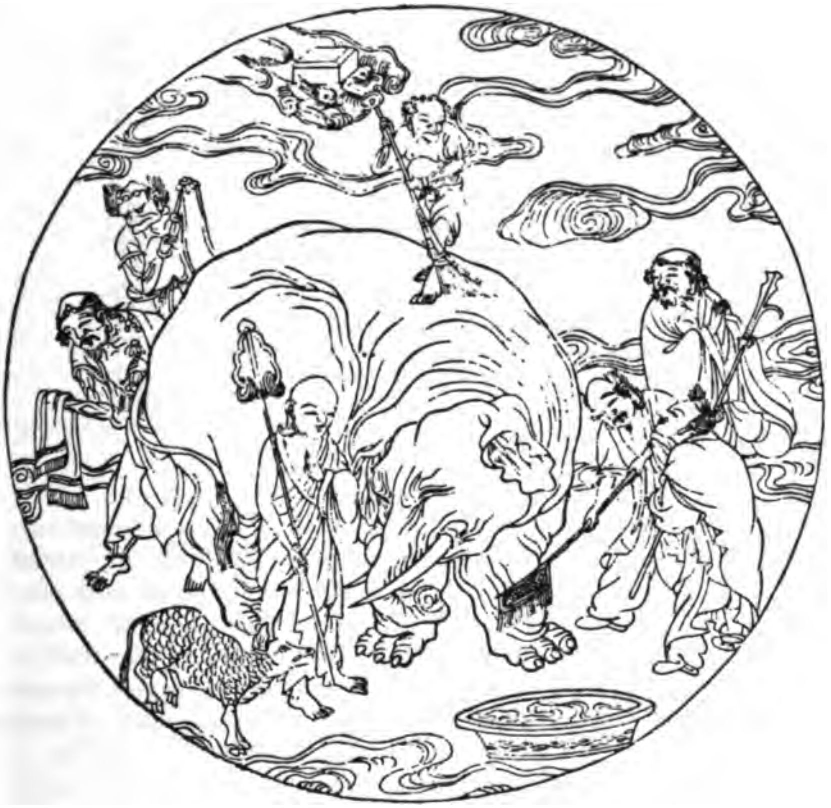

FIG. 11.
"Brushing the Elephant." Rhinoceros with Scaly Armor in Front. Wood-engraving from *Ch'êng-shi mo yüan.*

rhinoceros *si niu*, which is not described. They had also standards with designs of a three-horned animal (*san kio shou*) and the unicorn (*kio tuan*), which was outlined "like a sheep, with a small tail and a single horn on its crest."[1]

In plastic art,[2] the rhinoceros has been carved from jade either as the handle of a paper-weight or as the knob of a seal.[3] An example of either kind is illustrated in *Ku yü t'u p'u* (Ch. 74, p. 1, reproduced in Fig. 12; and Ch. 37, p. 11). The traditional reconstructions of the animal are here faithfully preserved; the three toes (the third, of course, is not visible) and the shape of the horn, though it is wrongly placed, come somewhat near the truth. The manufacturers of ink-cakes availed themselves of the same design for printing on the surface of their products. The *Ch'êng shi mo yüan* (Ch. 13, p. 30) illustrates "a spiritual rhinoceros" (*ling si*) with body of an ox, hump of a zebu, cloven feet, snout of a pig, and horn on the front.

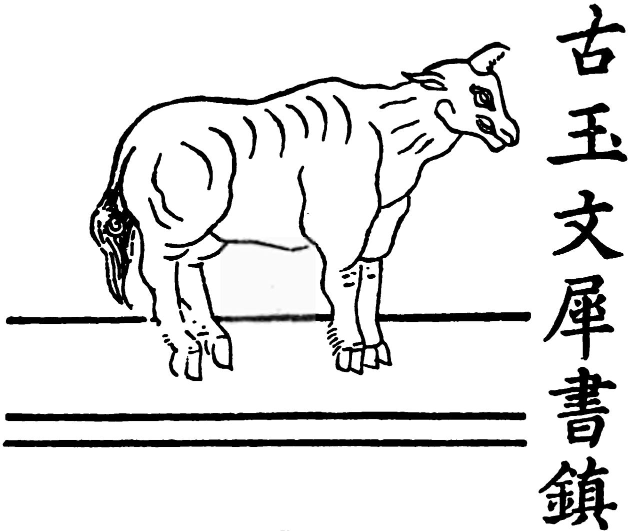

FIG. 12.
Ancient Paper-Weight of Jade surmounted by Figure of Rhinoceros (from *Ku yü t'u p'u*).

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[1] *Yüan shi*, Ch. 79, p. 10 (K'ien-lung edition).

[2] BUSHELL (Chinese Art, Vol. I, p. 91) figures a bronze vessel of the type styled *hi ts'un*, and describes it as being "shaped in the form of a rhinoceros standing with ears erect and a collar round the neck." But this explanation conflicts with Chinese tradition, according to which the animal *hi* is a sacrificial ox; and an ox is apparently represented in this bronze. Neither is there a single or double horn, which would be necessary to establish such a case.

[3] Seals surmounted by the full figure of a rhinoceros seem to make their first appearance in the Han period (see *Hou Han shu*, Ch. 40, p. 5).

The most curious item in the history of the iconography of the rhinoceros is the illustration of the animal in the *Chêng lei pên ts'ao* published in 1208 by the physician T'ang Shên-wei[1] (reproduced in Fig. 13). Here we see the animal represented as a hairy and spotted deer, its head being surmounted by a single curved horn, peacefully chewing a bunch of leaves with a most innocent expression on its face. The legend is *si kio* ("rhinoceros-horn"), all illustrations of animals in this work being named for the product yielded by them; and the illustration is immediately followed by the description of the two animals *se* and *si*, so that there can be no doubt that this figure, in the mind of the author, is intended for the rhinoceros. It will certainly not induce us to propose for the word *si* the new translation "cervine animal;" but a rhinoceros of cervine character has really existed in the imagination of the ancient world. The idea started from India, has taken a footing in the classical authors, and long survived even down to our middle ages. It is a fascinating story, deserving full discussion, the more so as it has never been clearly and correctly set forth. Two classical texts may first be quoted which fit well as an explanation to our Chinese woodcut. PLINY (*Nat. hist.*, VIII, 21) tells regarding the Orsaean Indians that "they hunt the indomitable, fierce *monoceros* (unicorn) which has the head of a *stag*, the feet of the elephant, the

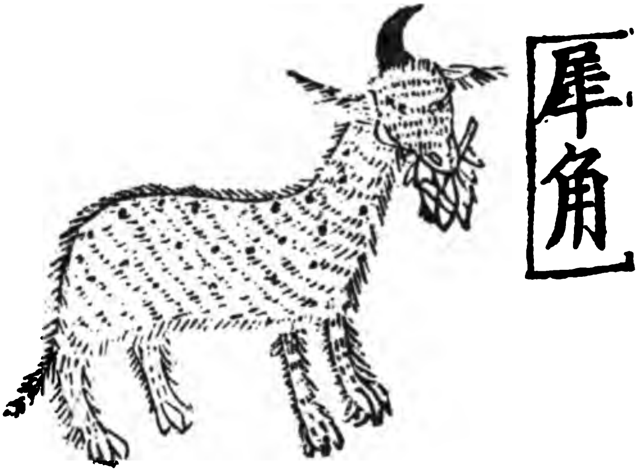

FIG. 13.
Deer with Single Horn, labelled Rhinoceros-Horn, being an Echo of the Indian Legend of Ekaçṛiṅga (from *Chêng lei pên ts'ao*, edition of 1523).

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[1] Regarding this work and its history see *T'oung Pao*, 1913, p. 351. In the edition of 1523 from which our illustration is taken it is in Ch. 17, fol. 20 b.

tail of a boar, while the rest of the body is like that of the horse; it emits a deep roar, and has on the middle of its forehead a single black horn two cubits in length. This beast, it is asserted, cannot be captured alive."[1] In the *Cyranides*, a curious Greek work written between 227 and 400 A.D.,[2] it is said, "The rhinoceros is a quadruped resembling the *stag*, having a very large horn on its nose. It can be captured only by means of the perfume and the beauty of well dressed women; it is indeed much inclined toward love."[3] The importance of this passage, first of all, rests on the fact that the single-horned cervine animal is here clearly identified with the rhinoceros, an identification not yet made by Pliny, who speaks of rhinoceros and monoceros as two distinct species; and we remember that Cosmas Indicopleustes makes the same distinction in regard to India. In his introduction, F. de Mély[4] observes that the *Cyranides* is the first work to reveal to us the starting-point of the legend of the chase of the unicorn which is nothing but the rhinoceros. This, however, is very inexact. The first Occidental source relating this legend is the *Physiologus* which is older than the *Cyranides*. The *Physiologus*[5] tells of the monoceros that it is a small animal resembling a buck, but very cunning; the hunter cannot approach it, as it possesses great strength; the horn grows in the centre of its head; it can be captured only by a pure virgin who suckles it; then she seizes it, and carries it into the palace of the king; or according to another version, the unicorn falls asleep while in the lap of the virgin, whereupon the hunters gradually approach and fetter it. The *monoceros* is located by Pliny in India; and the western legend of the unicorn ensnared by a virgin was first traced by S. Beal[6] to the ancient Indian legend of Ekaçriñga, the hermit Single Horn. H. Lüders,[7] who has traced with great ingenuity the development of the legend in the sources of Indian literature, justly points out that all our mediæval versions of the story,[1] as a last resort, go back to the Greek *Physiologus*, and that the last clause of the Greek text contains a visible trace of the old Indian legend of the king's daughter who carries away the penitent into the palace of her father. Lüders rises also against the view of Lauchert, who interprets the story in *Physiologus* from a misunderstood passage of AELIAN (XVI, 20); and I am in full accord with the criticism of Lüders, to which the argument should be added that this alleged influence of Aelian on the *Physiologus* is out of the question, as Aelian is in time posterior to the latter.[2] F. W. K. MÜLLER studied the same question in connection with a Japanese Nō play, the plot of which is the legend of Ekaçṛiṅga.[3] Müller likewise thinks Lauchert's explanation to be hardly plausible, and admits, with excellent arguments, the dependence of the *Physiologus* story on the tradition of India. There is but one point in which my opinion differs from the one expressed by Müller. Müller, at the close of his highly interesting study, advances the theory that the real unicorn, as already recognized by Marco Polo, may always have been the rhinoceros. Also O. Keller[1] has arrived at the same result, and reduced all ancient traditions and representations of the unicorn to the Indian rhinoceros. This opinion seems to me fundamentally wrong. Not one of the numerous variants of the ancient Indian tradition regarding the Hermit Single-Horn alludes in this connection to the rhinoceros; he is miraculously born from a gazelle, and has received his horn from the latter.[2] Single-Horn is not even his original name, but this one was Antelope-Horn (Ṛishya-çriṅga); and according to Lüders,[3] the name Single-Horn has arisen from the latter, owing to popular etymological re-interpretation caused by the tradition, already appearing in the Mahābhārata that the penitent had a single horn on his head. In other texts, the Padmapurāṇa, Skandapurāṇa, and Kanjur, he is even equipped with *two* horns, while the versions of the Rāmāyaṇa and the Pāli Jātaka make no statement with regard to the horn. The Greek *Physiologus*, in the story alluded to, avails itself of the word *monokeros* ("unicorn"), which literally corresponds in meaning to Sanskrit Eka-çriṅga, and describes the creature as a small animal resembling a buck, without any qualities inherent in the rhinoceros; and this is plainly corroborated by the illustration accompanying the *Physiologus*, in which the animal is outlined as a long-tailed antelope with a large single horn curved like that of a gazelle.[1] Pliny, as we saw, credits the *monoceros* of India with the head of a stag and a single horn on its forehead (that is, the gazelle-horned Ekaçṛiṅga), but does not identify it with the rhinoceros, which was well known to him from the circus. For the first time, as far as the West is concerned, the identification of the single-horned cervine animal with the rhinoceros is made in the *Cyranides*.[2] In the East, the first intimation of it leaks out in our Chinese illustration from *Chêng lei pên ts‘ao*, which depicts the rhinoceros in the form of a deer with one horn on its forehead, and which, without any doubt, is an offshoot of the Indian conception of Ekaçṛiṅga. Now, we encounter the curious fact that at a much older date also the Chinese mention a single-horned deer under the name *p‘ao* (No. 9104), described in the *Erh ya* as an animal "with the tail of an ox and one horn." Palladius[3] straightway translated the word by "rhinoceros," but this venture is not justified by Chinese tradition; the Chinese, in this case, make no reference whatever to the rhinoceros. On the contrary, Kuo P‘o, the editor and interpreter of *Erh ya*, states that the animal *p‘ao* is identical with the deer called *chang* (No. 407); and Yen Shi-ku (579–645), as quoted in K‘ang-hi's Dictionary, maintains that it resembles in shape the deer *chang*. The very definition shows that the animal *p‘ao* is a near cousin of the *k‘i-lin*[4] which has likewise "the tail

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[1] Orsaei Indi . . . venantur asperrimam autem feram monocerotem, reliquo corpore equo similem, capite cervo, pedibus elephanto, cauda apro, mugitu gravi, uno cornu nigro media fronte cubitorum duum eminente. hanc feram vivam negant capi. (Ed. of C. Mayhoff, Vol. II, p. 104.)

[2] F. de Mély, Les lapidaires grecs, p. lxxi; de Mély is the first editor and translator of this work.

[3] *L. c.*, p. 90.

[4] *L. c.*, p. lxv.

[5] F. Lauchert, Geschichte des Physiologus, pp. 22, 254 (Strassburg, 1889); F. Hommel, Die aethiopische Übersetzung des Physiologus, p. 68 (Leipzig, 1877); E. Peters, Der griechische Physiologus und seine orientalischen Übersetzungen, p. 34 (Berlin, 1898); K. Ahrens, Das "Buch der Naturgegenstände," p. 43 (Kiel, 1892).

[6] The Romantic Legend of Çakyamuni Buddha, p. 125; see also his Buddhist Records of the Western World, Vol. I, p. 113.

[7] Die Sage von Ṛṣyaśriñga (*Nachrichten d. k. Ges. d. Wiss. zu Göttingen*, 1897, pp. 1–49), p. 29; an additional study from his pen on the same subject *ibid.*, 1901, pp. 1–29.

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[1] Of the mediæval versions, that of JOHN TZETZES, the Byzantine poet and grammarian, who flourished during the twelfth century, in his *Chiliades* (v, 398), deserves special mention: "The monoceros carries a horn on the middle of its forehead. This animal is passionately fond of perfumes. It is hunted in this manner. A young man disguised as a woman exhaling the odor of the most exquisite perfumes takes his position in the places frequented by this quadruped. The hunters lie in ambush at a short distance. The odor of the perfumes soon attracts the monoceros toward the young man; it caresses him, and he covers its eyes with perfumed woman's gloves. The hunters hasten to the spot, seize the animal which does not offer resistance, cut off its horn, which is an excellent antidote to poison, and send it back, without inflicting on it further harm."

[2] Claudius Aelianus flourished under Septimius Severus, and probably outlived Elagabalus (218–222 A.D.). His writings come down from the beginning of the third century (BAUMGARTEN, POLAND, and WAGNER, Die hellenistisch-römische Kultur, p. 615, Leipzig, 1913), while the *Physiologus* was written in Alexandria as early as the second century (*ibid.*, p. 622). Little is known about Aelian's life; only Philostratus and Suidas have some brief notes regarding him. He availed himself of the writings of Athenaeus, who wrote at the time of Elagabalus, or in the first years of Alexander Severus (222–235); Philostratus mentions his death in his Lives of Sophists composed between 222 and 244. As regards the *Physiologus*, it is necessary to discriminate between the final Greek recension clothed in a Christian-theological garb, as we have it now, and the primeval source or sources of animal stories without the allegories, from which the former was extracted. LAUCHERT (*l. c.*, p. 42) certainly is quite right in rejecting the hypothesis of an "*Urphysiologus*" in the sense that it was a literary production serving as model to our *Physiologus;* but a primeval *Physiologus* must be presupposed for about the beginning of the first century, in the sense that it simply was an assemblage of verbal stories current in Alexandria, and some of which were imported from India (compare *T'oung Pao*, 1913, pp. 361–4).

[3] Ikkaku sennin, eine mittelalterliche japanische Oper (*Bastian Festschrift*, pp. 513–538, Berlin, 1896). Lüders, whose work appeared in 1897, did not take note of Müller's investigation; it seems that the treatises of both scholars originated about the same time, and independently of each other. Compare also J. TAKAKUSU, The Story of the Ṛṣi Ekaśṛṅga (*Hansei Zasshi*, Vol. XIII, 1898, pp. 10–18); and K. WADAGAKI, Monoceros, The Rishi (*ibid.*, pp. 19–24).

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[1] Die antike Tierwelt, Vol. I, pp. 415–420; this is presumably the weakest chapter of an otherwise intelligent and excellent book. I do not understand how Keller arrives at the opinion that the ancients in general treat *monoceros*, *unicornis*, and *rhinoceros* as identical notions, and in most cases conceive them as the African rhinoceros. The historical connection of the unicorn legend with Ekaçriṅga has escaped Keller entirely.

[2] The iconography of Ekaçriṅga in Indian art has been traced by Lüders and Müller. It is notable that any suggestion of a rhinoceros is absent. As proved by the masks of the hermit used in the dramatic plays of Japan and Tibet (Plate X), he was conceived as a human being with a single, short, forked horn, or with a very long, curved horn. The illustration of the Japanese mask is derived from the work *Nōgaku dai-jiten* (Dictionary of Nō Plays) by Masada Shōjirō and Amaya Kangichi (Tōkyō, 1908; compare *Bulletin de l'Ecole française d'Extrême-Orient*, Vol. IX, 1909, p. 607). The Tibetan mask, much worn off by long use, was obtained by me from a monastery of Bagme, in the western part of the province of Sze-ch'uan. It is very striking that the rhinoceros hardly plays any rôle in the culture-life, folklore, or mythology of India. The allusions to it in literary records are exceedingly sparse. The word *khaḍga* appears but a few times in Vedic literature, a rhinoceros-hide being mentioned in one passage as the covering of a chariot (Macdonell and Keith, Vedic Index, Vol. I, p. 213, London, 1912). The animal is mentioned in the inscriptions of King Açoka (third century B.C.); and the consumption of its flesh, blood, and urine plays a certain rôle in Indian pharmacology (see Chakravarti, *Mem. As. Soc. Beng.*, Vol. I, p. 370, Calcutta, 1906; and Hooper, *J. As. Soc. Beng.*, Vol. VI, 1910, p. 518). It is very curious that no Indian record regarding rhinoceros-horn cups and their antipoisonous virtues has as yet been pointed out; our information on this point rests on Ctesias, Aelian (see below, p. 115), some Arabic authors, and more recent observers like Linschoten and Garcia ab Horto (Aromatum et simplicium aliquot medicamentorum apud Indos nascentium historia, p. 66, Antverpiae, 1567), who says, "Illud tamen scio Bengala incolas eius cornu adversus venena usurpare, unicornu esse existimantes, tametsi non sit, ut ii referunt qui se probe scire autumant." It remains to be pointed out also that the literatures of India contain no accounts of unicorns.

[3] *L. c.*, p. 28.

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[1] Figured by Strzygowski, Der Bilderkreis des griechischen Physiologus, Plate XII (*Byzantinische Zeitschrift*, Ergänzungsheft 1, 1899), and Keller (*l. c.*, p. 419). Regarding the illuminated editions of the *Physiologus* see also O. M. Dalton, Byzantine Art, p. 482 (Oxford, 1911).

[2] Neither Lüders nor Müller has consulted these two important passages of Pliny and the Cyranides.

[3] Chinese-Russian Dictionary, Vol. I, p. 58.

[4] At times a temptation was felt to identify the animal *lin* with the rhinoceros. Shên Kua, the versatile author of the *Mêng k‘i pi t‘an* of the twelfth century, narrates that in the period Chi-ho (1054–56) the country Kiao-chi (Annam) offered a *lin* like an ox, having the entire body covered with large scales and a single horn on its head. There is no question that this animal was a rhinoceros; this follows also from the further observation of the author that it did not resemble the *lin*, as described in ancient records, and that there were people designating it as a mountain-rhinoceros (*shan si*, a variety recognized also by Li Shi-chên). But as Shên Kua could not trace any report in which scales are attributed to the rhinoceros (for explanation see p. 149), he formed the erroneous theory that the animal in question was identical with the *T‘ien-lu* cast in bronze by the Emperor Ling in 186 A.D., a specimen of which he had beheld at Nan-yang in Têng chou in Ho-nan. In a similar manner, Fan Chên of the Sung period, in his work *Tung chai ki shi* (Ch. 1, p. 8; in *Shou shan ko ts‘ung shu*, Vol. 84), tells the story of two *K‘i-lin* sent as tribute from Kiao-chi in the period Kia-yu (1056–63), which he had occasion to see in the imperial palace. He describes them as having the shape of water-buffalo clad with a fleshy armor, and equipped with a single horn on the extremity of the nose; they subsisted on grass, fruit, and melon, and every time before feeding had to be beaten on their horns with a stick. This writer likewise concludes with a discussion, in which serious doubts of the identification of these animals with the *lin* are expressed.

of an ox and a single horn."[1] Indeed in the *Erh yu t'u*, both creatures are figured almost alike, and agree in their essential characteristics. It is obvious that, as iconographic types, these creatures are not derived from any rhinoceros, but point in the direction of the fabulous one-horned monsters (known in archæology as "Oriental animals") developed in the art of Mesopotamia.[2] In regard to the type of *k'i-lin*, this has been aptly pointed out by A. Grünwedel;[3] and as the same West-Asiatic forms found their way into the art of India, we here have the basis for the origin of the single-horned gazelle (deer or antelope) transferred to, or personified in, the person of Ekaçṛiṅga. In Babylonia, these types of unicorn are very ancient, going back to the third millennium B.C.,[4] and could not have been developed there from a rhinoceros. The conclusion therefore presents itself that the notion of a unicorn cervine animal which was developed in Western Asia from remote times spread together with artistic motives into India and China,[5] while the identification of this fabulous creature with the rhinoceros — owing to the single horn — is the product of a much later period; this is not the starting-point, but the final result of the matter. It is, of course, necessary to assume that this result was brought about in India itself;[1] otherwise it would be unintelligible why it appears on the surface in the *Cyranides* and in China.[2] In my opinion, we are even

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[1] Regarding the *k'i-lin* see Yen Shi-ku (in *Ts'ien Han shu*, Ch. 6, p. 5 b); Mayers (Chinese Reader's Manual, p. 127); F. W. K. Müller (in *Feestbundel aan P. J. Veth*, p. 222, Leiden, 1894); De Groot (The Religious System of China, Vol. II, pp. 822–4); and H. Doré (Recherches sur les superstitions en Chine, pt. 1, Vol. II, pp. 446–8). I do not subscribe to everything that the last two authors say about the subject. The Chinese illustrations are reproduced in C. Gould (Mythical Monsters, pp. 350, 353, 354, London, 1886).

[2] A distinction must be made between iconographic or archæological type or artistic representation, and traditions or speculations regarding such a type. The *lin*, as early mentioned in *Shi king* and *Li ki*, may very well be an indigenous Chinese thought. Nevertheless its subsequent portrayal in art rests on a borrowed type, which has again fertilized native ideas as to form and behavior of the creature. An interesting example of the fact that iconography and literary tradition may move along lines widely different and emanating from diverse sources is afforded by the unicorn of Europe. The unicorn tradition of the *Physiologus* is traceable to India; the iconography of the creature, however, has no connection with Indian art, but leans in the beginning toward the ancient West-Asiatic types. Throughout the middle ages, there is not a trace of the rhinoceros in the representations of the unicorn (compare Marco Polo's astonishment when he saw the ugly beast on Java, "not in the least like that which our stories tell of as being caught in the lap of a virgin, in fact, altogether different from what we fancied"); now it is an antelope, now an ox, now a narwhal, now a hybrid formation composed of various creatures. My opinion in this respect deviates from the one expressed by Strzygowski (*l. c.*) that there may be interaction between the animal types of the earliest Buddhist art in India and those of the *Physiologus*. It is not there the question of interaction, but of affinity, solely caused by West-Asiatic productions which both have in common as their source.

[3] Bemerkungen über das Kilin (*Feestbundel aan P. J. Veth*, pp. 223–5, Leiden, 1894), and Buddhist Art in India, p. 19.

[4] E. Schrader, Die Vorstellung vom monokeros und ihr Ursprung (*Abhandlungen der preussischen Akademie*, 1892, pp. 573–581).

[5] In order to dispel the doubts of those who may not feel inclined in this case to link China with the West, another striking analogy may be indicated, which will show that Chinese ideas regarding unicorns coincide with those entertained in the West, and which crop up in the classical authors. In the *Erh ya* is defined an animal called *chui* (written with the classifier 'horse' and the phonetic complement *sui*, No. 10,388), "like a horse with a single horn; those without horn are spotted." Kuo P'o comments,

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"In the eighth year of the period Yüan-k'ang (298 A.D.) it was in the territory of Kiu-chên (in Tonking) that hunters captured a wild animal of the size of a horse with one horn, the horn being soft as the core of the young antlers of the deer (*lu jung*). This is identical with the animal *chui*. At present men sometimes meet it in the dense mountainous jungles, and there are among them also those without horn." Kiu-chên is situated in Tonking; and on p. 81 mention has been made of the tribute of a live rhinoceros sent from there to the Emperor Ling (168–188 A.D.); indeed, that region was always famed for this animal, which is apparently intended in the text of Kuo P'o. The same conception of the rhinoceros as a horse or horse-like animal with a single horn is met likewise in the West. The ancients enumerate altogether five animals as having single horns, the Indian ass first traceable to Ctesias, the single-horned ox, the monoceros, the single-horned horse, and the oryx of Africa. STRABO (XV, 56) quotes from Megasthenes' remarks upon Indian animals that there are horses in India with one horn. AELIAN (*Nat. anim.*, III, 41) says, "India, it is reported, produces horses with a single horn, likewise single-horned asses. Cups are made from these horns; and if a mortal poison is poured into them, it will do no harm to him who drinks it, for the horn of both animals seems to be an antidote against poison." In another chapter (XVI, 20) AELIAN describes the unicorn of the Indians, "called by them *kartazonos* [a word apparently connected with Assyrian *kurkizannu*, mentioned above, p. 87], said to equal in size a full-grown horse." HORACE (*Serm.*, I, 5, 58–60) speaks of a wild horse having a single horn in the midst of its forehead. As a matter of fact, the rhinoceros has no similarity to a horse; and it is difficult to see how the simile could ever arise. The bare fact remains, however, that it did; but it is inconceivable that this notion, not founded on a natural observation, could spontaneously spring up in the West and East alike. There is no other way out of this puzzle than to presume that India, to which the account of Megasthenes reproduced by Strabo and Aelian refers, is responsible for this idea, and disseminated it to the West and to China.

[1] It may be pointed out in this connection, though it is not wholly conclusive for the present case, that the Sanskrit word *vārdhrāṇasa* means a rhinoceros and an old white goat-buck.

[2] We meet also in ancient China a unicorn conceived of as a wild goat. This is the animal termed *chai* (No. 245) and *kiai* (No. 4423) *chai*. The fundamental passage relating to it is in the Annals of the Later Han Dynasty (*Hou Han shu*, Ch. 40, p. 3), where a judicial cap in the shape of this animal, and worn by the censors, is mentioned. The definition given of the animal in the text of the Annals is, "A divine goat (*shên yang*) which is able to discriminate between right and wrong, and which the king of Ch'u used to capture." Huai-nan-tse is quoted in K'ang-hi (under *kiai*) as saying that King Wên of Ch'u was fond of wearing *kiai* caps; the un-Chinese word *kiai chai*, therefore, will probably be a word of the language of Ch'u (T. DE LACOUPERIE, Les langues de la Chine avant les Chinois, p. 17, Paris, 1888), as above all proved by the vacillating modes of writing (FORKE, Lun-hêng, pt. II, p. 321). The comment added to the text of *Hou Han shu* is extracted from *I wu chi*, which may be read in SCHLEGEL's Uranographie chinoise, p. 587 (it is, of course, impossible, as proposed by Schlegel, to identify the animal with the Tibetan *chiru;* see below, p. 120). It is not stated in *Hou Han shu* nor in *I wu chi* (nor in K'ang-hi) that "it eats fire in its ravenous fury, even to its own destruction" (GILES). This is a subsequent addition which arose under the influence of Buddhist art. F. W. K. MÜLLER (*Feestbundel aan P. J. Veth*, p. 222, Leiden, 1894) has recognized correctly that this explanation is derived from the iconography of the animal, which is represented as being surrounded by flames. Müller, however, omits to state that this is a secondary development, which has nothing to do with the previous pre-Buddhistic conception of the creature on Chinese soil, when it was not equipped with flames, nor set in relation with a lion. The

forced to admit that the counterpart to the illustration of the *Chêng lei pên ts'ao* has already pre-existed in India, and was transmitted from there to China; for neither the author of that work, nor any other Chinese source, as far as I know, furnishes any explanation for this picture. An unexpected confirmation of this opinion comes to us from another quarter, — Tibet.

In the Tibetan language we meet the word *bse-ru* which at present denotes two animals, — first, the rhinoceros, and second, a kind of antelope. The former is the original and older significance, the latter is secondary. The second element of the compound, *ru*, means "horn," and may be dropped; the proper word is *bse* (pronounced *se*). The stem is *se*, the prefixed labial *b-* not being part of the word-stem, and like most prefixes in Tibetan nouns, representing the survival of an ancient numerative. This is corroborated by the corresponding Lepcha word *sa* and the Chinese word *se*, all three referring to the rhinoceros. This linguistic coincidence leads to the conclusion that the Chinese and Tibetans as stocks of the large Indo-Chinese family of peoples were acquainted with the rhinoceros in prehistoric times, for otherwise they could not have the word for it in common; and this conclusion will be fully upheld by our historical inquiry into the subject. This fact of comparative philology is also apt to refute the supposition of Mr. Giles that "a term which originally meant a bovine animal was later on wrongly applied to the rhinoceros." As proved by comparison with the Tibetan and Lepcha words, the Chinese term originally must have designated the rhinoceros.[1] Above all it is incumbent upon me to demonstrate that the Tibetan word *bse* really designates the rhinoceros, and that the Tibetans were familiar with this animal. The ancient

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translation "lion-unicorn" adopted by Müller is not to the point, as far as the time of Chinese antiquity is concerned. The *hiai chai* is not explained as a lion (nor could this be expected, as the lion was unknown in ancient China), but as a divine wild goat (*shên yang*). The fact that the conception of the animal existed among the Chinese in times prior to the contact with India is clearly proved by the occurrence of the word in Huai-nan-tse, in *Tso chuan* (Sûan Wang 17th year: LEGGE, Chinese Classics, Vol. V, p. 332), Se-ma Ts'ien's *Shi ki* (Ch. 117), *Lun hêng*, *Hou Han shu*, *Erh ya*, and *Shuo wên*. Only in such late compilations as the Japanese version of the *San ts'ai t'u hui* do we meet the statement that the animal resembles a lion, merely because it is sketched like a lion crowned with a single horn (see L. SERRURIER, Encycl. japonaise, le chapitre des quadrupèdes, Plate III; or E. KAEMPFER, The History of Japan, Vol. I, p. 195, Glasgow, 1906). The connection of this creature with the rhinoceros, and its transformation into a goat, will be discussed below (p. 171).

[1] The hypothesis of such "confusions," which are usually assumed to suit one's own convenience, is untenable also for other reasons obvious to every ethnologist: people in the primitive stages of culture, being nearer to nature than we, are surely the keenest observers of animal life and habits, and will most assuredly never confound a bovine animal with a rhinoceros; they may, by way of explanation, compare the one with the other, but from comparison to confusion is a wide step.

Sanskrit-Tibetan dictionary Mahāvyutpatti[1] renders the Tibetan word *bse* by the Sanskrit word *gaṇḍa* which refers to the rhinoceros.[2] Wherever this word appears in the works of Sanskrit Buddhist literature, it is faithfully reproduced in the Tibetan translations by the word *bse*. An interesting example of its application appears in a Tibetan work from the first part of the ninth century.[3] It is well known that in India the Pratyeka-Buddha was styled Single-Horn Hermit and compared with the solitary rhinoceros;[4] and this simile is explained in that Tibetan book in the words that the Pratyeka-Buddha, who in the course of a hundred eons (*kalpa*), through the accumulation of merit, is no longer like ordinary beings, resembles the rhinoceros in his habit of living in the same solitary abode. It is interesting to note that in this early Tibetan text the word *bse-ru* is used for the designation of the rhinoceros. This comparison has passed into Tibetan poetry, and is frequently employed by the mystic and poet Milaraspa, who speaks of himself as being "lonely like a rhinoceros."[5] This meaning of *bse* is confirmed by two Chinese lexicographical sources,— the *Hua i yi yü*, which in its Tibetan-Chinese vocabulary[6] renders *bse-ru* by Chinese *si niu;* and the Polyglot Dictionary of the Emperor K'ien-lung (Ch. 31, p. 4 a), where *bse* is explained by Chinese *si* ("rhinoceros"). The national Tibetan word *bse*, akin to Lepcha *sa* and Chinese *se*, naturally bears out the fact that the ancient Tibetans were familiar with the animal. We know that the primeval habitat of the Tibetan stock was located along the upper course of the Huang-ho (where Ptolemy knows them as *Bautai*, derived from the native name *Bod*, "Tibetans;" the Yellow River is styled by him *Bautisos*), as well as along the upper Yang-tse. There they lived in close proximity to the ancient Chinese; and in that locality, as will be established from Chinese records, the rhinoceros was their contemporary. Large parts of the present Chinese provinces of Kan-su and Sze-ch'uan are still settled by Tibetan tribes; and we shall see that the rhinoceros occurred there in the times of antiquity, and long survived, even down to the middle ages. The Pai-lan — a tribe belonging to the Tibetan group of the K'iang, and bordering in the north-east on the Tu-yü-hun — in 561 A.D. sent an embassy to China to present a cuirass of rhinoceros-hide (*si kia*) and iron armor.[1] Whether they had made this cuirass themselves, or had received it from an outside source (this fact is not indicated), this tribute, at any rate, shows that they were acquainted with this material and its manufactures.[2] The *Pên ts'ao yen i* of 1116 extols the horns of the Tibetan breed of rhinoceros for the fine quality of the natural designs displayed in them (see p. 148). Li Shi-chên, in his *Pên ts'ao kang mu* (see p. 149), expressly names as habitats of the rhinoceros the regions of the Si Fan and Nan Fan; that is, the western and southern Tibetans, — the former scattered over Sze-ch'uan and Yün-nan with their borderlands, the latter peopling the valley of the Tsang-po (Brahmaputra) and the Himalayan tracts adjoining India. Indeed, down to the middle of the nineteenth century, or even later, the rhinoceros was to be met with along the foot of the Himalaya as far west as Rohilkund and Nepal; and it survived longer still in the Terai of Sikkim.[3] J. CH. WHITE [4] notes the rhinoceros in a few of the lower valleys of Bhūtan, though not common. In Tibet proper, the animal does not occur at present, but fossil remains of it were discovered at high elevations by Sir R. Strachey near the source of the Tsang-po.[1] The early Tibetan translators, when they correctly rendered the Sanskrit word *gaṇḍa* by *bse*, must have entertained an exact notion or reminiscence of the rhinoceros; but the animal, as everywhere, became rapidly exterminated in those territories where Tibetans had occasion to behold and to hunt it, while the inhabitants of Central Tibet seldom or never had this opportunity. For this reason, also in Tibet, the rhinoceros underwent the process of fabulous "unicornization." Reports of a Tibetan unicorn greatly stirred the imagination of European explorers, and gave rise to wild speculations. Captain S. TURNER,[2] I believe, was the first to circulate such a report, being informed by the Rāja of Bhūtan that he was in possession of a unicorn, a sort of horse, with a horn growing from the middle of its forehead; it was kept at some distance from Tassisudon, the capital, and the people paid it religious respect, but Turner had no occasion to see it. The Lazarist fathers Huc and Gabet, who reached Lhasa in 1846, are said to have even claimed the discovery in Tibet of the unicorn of Scripture. Major Latter, in the first part of the nineteenth century, was very sanguine of being able to find a veritable unicorn in the interior of Tibet: he was advised by a native that he had often seen these animals, which "were fierce and exceedingly wild and seldom taken alive, but frequently shot;" and that they are commonly met with on the borders of the great desert, about a mile from Lhasa. From a drawing which accompanied Major Latter's communication, the presumed unicorn was something like a horse, but with cloven hoofs, a long, curved horn growing out of the forehead, and a boar-shaped tail. Under the heading "Unicorns in Asia,"[3] a writer revived the opinion of the existence of veritable unicorns, such as were reported to Major Latter: the animal in question was of the deer kind, having a single horn at the top of the head; it was known by the name of the *Seru*.[4] Then the famous J. D. HOOKER[1] took the matter in hand, and published a sketch of the Chiru Antelope with the addition "unicorn of Tibet," a name which he thought was suggested by the animal when viewed in profile. It is identified as *Antilope* or *Pantholops Hodgsoni*, having been described by HODGSON.[2] It remains a mysterious creature, and little is known about it.[3] P. LANDON[4] denies that this antelope, as pointed out by Hooker, occurs near the Cholamu Lake at the present day. L. A. WADDELL[5] reports under *Chiru*, "None were seen and the people did not appear to know of any."

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[1] Tanjur (Palace edition), Sūtra, Vol. 123, fol. 265 a. This work was written in the first part of the ninth century.

[2] Al-Bērūnī (Sachau, Alberuni's India, Vol. I, p. 203) knew this word, and correctly described under it the rhinoceros of India (p. 95). It is likewise mentioned by Garcia ab Horto (*l. c.*) and other early European travellers enumerated by Yule and Burnell (Hobson-Jobson, p. 363). The rhinoceros brought to Portugal in 1515 (mentioned above, p. 83) was labelled "rhinocero, called in Indian *gomda.*"

[3] Entitled *Sgra sbyor bam-po gñis-pa* (Tanjur, Sūtra, Vol. 124, fol. 14 a, 4), correctly dated by G. Huth (*Sitzungsberichte der preussischen Akademie*, 1895, p. 277) in the first part of the ninth century. Compare also the application of the word in Tāranātha (Schiefner's translation, p. 245): the sorcerer Ri-ri-pa summoned the fierce beasts of the forest, the rhinoceros and others, and mounted on their backs.

[4] Eitel, Hand-book of Chinese Buddhism (pp. 76, 123, 197); F. W. K. Müller, Ikkaku sennin (*l. c.*, p. 530); and H. Kern, Manual of Indian Buddhism (pp. 61 and 62, note 1).

[5] G. Sandberg (Tibet and the Tibetans, p. 297), who is ignorant of the fact that *bse* or *bse-ru* means "rhinoceros," and who merely carries the modern popular meaning of the word, "antelope," into the sphere of literature, makes Milaraspa say that he is "lonely as a seru" (antelope). The antelope, however, is not a lonely, but a highly social animal living in herds. Nowhere in Buddhist literature has *bse-ru* the significance of "antelope," but only that of "rhinoceros." The Tibetan poet, who in every line is imbued with the language and spirit of India, most obviously intends with this simile a literary allusion to the Buddhist comparison of the Pratyeka-Buddha with the rhinoceros.

[6] Copied by me from the manuscript deposited by Hirth in the Royal Library of Berlin. Regarding the work see Hirth (*J. China Branch R. As. Soc.*, Vol. XXII, 1888, pp. 207 *et seq.*), and *Bull. Ecole française*, 1912, p. 199.

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[1] *Chou shu*, Ch. 49, p. 5 b.

[2] In the year 824 the Tibetans offered to the Chinese Court silver-cast figures of a rhinoceros and a stag (*T'ang shu*, Ch. 216 B, p. 6 b). BUSHELL (The Early History of Tibet, p. 88) translates the word *si* in this passage by "yak," but this point of view is not admissible. True it is that some modern Chinese writers on Tibet call the yak *si niu*, but this usage of the word is not earlier than the eighteenth century. The T'ang Annals, however, persistently designate the Tibetan yak by the word *li niu* (No. 6938); and in the very passage alluded to, the gift of the rhinoceros and stag silver figures is immediately followed by the words, "and they brought as tribute a yak" (*kung li niu*), which BUSHELL correctly interprets likewise as yak. The words *si* and *li niu* in the same sentence cannot possibly refer to the same animal; and it becomes evident from a consideration of all Chinese sources concerned that down to the end of the Ming dynasty the Chinese word *si* with reference to Tibet and Tibetan tribes invariably denotes the rhinoceros, and nothing else. Rhinoceros-horn was formerly included among the tribute gifts which the Dalai Lamas of Tibet were obliged to send to China; it took its place between coral, genuine pearls, precious stones, amber, etc. (*Wei Tsang t'u chi*, 1792, Ch. A, p. 17).

[3] R. LYDEKKER, The Game Animals of India, p. 30.

[4] Sikhim and Bhutan, p. 322 (London, 1909).

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[1] A. R. WALLACE (The Geographical Distribution of Animals, Vol. II, p. 214; also Vol. I, p. 122) refers to this in the words that more than twenty species of extinct rhinoceroses are known, and that one has even been found at an altitude of 16,000 feet in Tibet. Mr. L. A. WADDELL (Lhasa and its Mysteries, p. 315) has this suggestive remark: "The dense rank growth of wildflowers and weeds along the borders of the fields was such as to make this part of the Tsang-po oasis a quite suitable habitat for the rhinoceros, and to bring the discovery of the fossil remains of that animal by Sir R. Strachey near the source of this river into harmony with present-day facts."

[2] An Account of an Embassy to the Court of the Teshoo Lama, p. 157 (London, 1800).

[3] *Asiatic Journal*, Vol. II, 1830.

[4] Compare W. HAUGHTON, On the Unicorn of the Ancients (*Annals and Magazine of Nat. Hist.*, Vol. IX, 1862, pp. 368, 369).

In Anglo-Indian nomenclature we now find two words in use, *chiru* and *seru*, the latter also Anglicized as *serow*, on which YULE, in his "Hobson-Jobson," unfortunately has not commented. *Serow* has become a household stock-word of the Anglo-Indian sportsman to denote a large variety of different Indian, Burmese, and Tibetan antelopes.[6] G. SANDBERG[7] recognizes in it the Tibetan word *bse-ru*, and identifies the latter with the species *Nemorhaedus bubalinus*. JÄSCHKE[8] says under *bse* or *bse-ru*, "Unicorn, 'tchiru,' an antelope, probably the same as *gtsod*," with reference to Hooker. CHANDRA DAS,[9] who has fully recognized the original meaning of *bse-ru* as "rhinoceros," proceeds to state that in Tibet the word is applied to the clumsy-looking deer known to sportsmen as the "serow." Both lexicographers, in this respect, rely on the statements of the European sportsmen, but leave us in the dark as to the opinion of the Tibetans on the point. The question arises, — Do those European speculations on a Tibetan unicorn identified with an antelope styled *se-ru* have any foundation in a Tibetan tradition? The French Missionaries, in their Tibetan Dictionary (p. 1056), give a slight intimation of the existence of such a tradition by remarking that the animal *bse-ru* is believed in Tibet to belong to the genus of goats (*ex genere caprarum*), but that nobody has ever seen it; the latter clause doubtless means that nobody has encountered this wild goat in the shape of a unicorn which it is fabled to be. I. J. SCHMIDT[1] had a certain presentiment of the matter when he annotated a passage in his translation of the Geser Saga, that the Tibetan and Mongol name of the unicorn is *seru*, that the existence of this animal in the wild mountains of Tibet is asserted in Tibetan books, but that the description given of it does not at all fit the rhinoceros. The unicorn which stopped Chinggis Khan on his expedition to Tibet and induced him to return,[2] judging from the description given by the Tibetan historian,[3] is identical with the Chinese *k'i-lin*, as already recognized by G. SCHLEGEL.[4] Another association of the unicorn with Tibet appears on the tribute painting ascribed to Li Kung-lin (Li Lung-mien), where BONIN[5] has pointed it out among the envoys from the Kingdom of Women. In the Polyglot Dictionary of the Emperor K'ien-lung[6] we find the Tibetan

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[1] Himalayan Journals, 2d ed., p. 401 (London, 1893).

[2] *Journal As. Soc. Bengal*, 1846, p. 338.

[3] N. KUEHNER, Description of Tibet, in Russian (Vol. I, pt. 2, p. 157; and notes p. 77).

[4] Lhasa, Vol. I, p. 393.

[5] Lhasa and its Mysteries, p. 483.

[6] R. LYDEKKER, The Game Animals of India, pp. 139 *et seq.* M. DAUVERGNE (*Bull. Musée d'hist. nat. de Paris*, Vol. IV, 1898, p. 219) describes the animal as follows: "Serow; Ramu de Kashmir, ou chèvre-antilope, *Nemorhaedus bubalinus* Hodgs. Habite les rochers escarpés et broussailleux des montagnes, à une hauteur de 3,000 mètres, dans l'Himalaya et Kashmir. Très difficile à chasser, il tient tête aux chiens, qu'il fait rouler dans les précipices. C'est généralement l'hiver qu'on le chasse, car alors il se détache sur la neige, grâce à la teinte noire de sa robe, et comme il est très lourd, il s'effondre et se fait prendre par les chiens."

[7] Tibet and the Tibetans, p. 297. On p. 298 he points out that the word *chiru* should be written *gcig ru* ("one horn"). This derivation is impossible, as "one horn" can be in Tibetan only *ru* (or *rva*) *gcig*, or *ru šig*. The name Ekaçṛiṅga is rendered into Tibetan *Rva gcig-pa*. (Compare also *Hor c'os byuṅ*, ed. HUTH, p. 16, l. 14.) *Chiru* is simply a local or dialectic variation of *se-ru*. Strange words exert a singular fascination upon the human mind. The Anglo-Indian *chiru* has had several good fortunes. Thanks to the imaginative powers of G. SCHLEGEL (Uranographie chinoise, p. 587), it has found cheerful hospitality in Chinese astronomy, the Chinese animal *hiai* being wrongly identified with it. A few years ago the *chiru* was deemed worthy of the honor of being admitted into the sanctum of classical philology. O. KELLER (Die antike Tierwelt, Vol. I, p. 293) identifies the Indian Oryx mentioned by Aelian, and the Oryx on the Hydaspes mentioned by Timotheus, with the Tibetan *chiru*,— a venture which has no foundation; in fact, the oryx of Aelian is located in India, and corresponds to the Indian black-buck.

[8] Tibetan-English Dictionary, p. 593. Skr. *khaḍga* rendered by JÄSCHKE "a certain animal" is the rhinoceros.

[9] Tibetan-English Dictionary, p. 1319.

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[1] Die Thaten Bogda Gesser Chan's, p. 56 (St. Petersburg, 1839). Compare also p. 125.

[2] G. HUTH, Geschichte des Buddhismus in der Mongolei, Vol. II, p. 25.

[3] "An animal of green color with the body of a stag, the tail of a horse, and a single horn on its head."

[4] *T'oung Pao*, Vol. VI, 1896, p. 433. According to Chinese tradition, however (see the texts of *Kui sin tsa chi* and *Ch'o keng lu*, in *T'u shu tsi ch'êng*, Chapter *kio tuan*, *ki shi*, p. 1 b), the marvellous animal opposing the conqueror belonged to the class of unicorns (*kio tuan*), and is described as a hundred feet high, with a single horn like that of the rhinoceros, and able to speak a human language.

[5] Le royaume des neiges, pp. 40, 299 (Paris, 1911). M. Bonin's description of this painting is based on a copy of it in the Musée Guimet, which is certainly not the original from the hand of Li Kung-lin; it is a much later and somewhat weak copy, as stated also by TCHANG YI-TCHOU and HACKIN (La peinture chinoise au Musée Guimet, p. 59). On Plate V of the latter publication, the portion of the picture illustrating the envoys of the Kingdom of Women is reproduced; the unicorn is a wretched production. Mr. Freer of Detroit owns two copies of the same painting, both far superior to the one in the Musée Guimet. One of these offers such high qualities as come very near to an original. The other is a copy of the Yüan period, executed in 1364.

[6] Appendix, Ch. 4, p. 53.

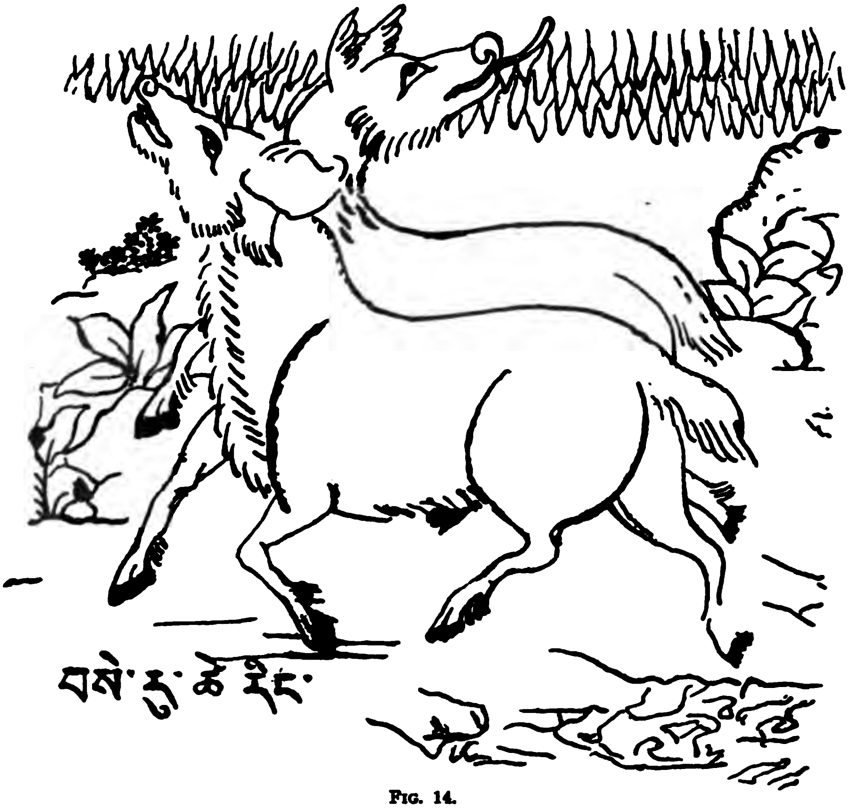

FIG. 14.
Se-ru as Emblem of Long Life (from Tibetan Wood-engraving).

word *bse-ru* rendered by Chinese *shĕn yang* ("divine goat");[1] and this is thus far the only literary indication which I am able to trace in regard to a Tibetan unicorn of goat-like character.[2]

Such a *bse-ru* is represented on a Tibetan woodcut as an emblem of long life (*bse-ru ts'e riṅ;* Fig. 14). The picture, of which it forms a part, is known as "the six subjects of long life" (*ts‘e riṅ drug skor*). These are,— the Buddha Amitāyus (the Buddha of Endless Life), the long-lived wishing-tree (*dpag bsam šiṅ ts‘e riṅ*) figured as a peach-tree in Chinese style, the long-lived rocks (*brag ts‘e riṅ*), the Chinese God of Longevity Shou-sing (in Tibetan *Mi ts‘e riṅ*) seated on a mat and holding a rosary, a pair of cranes (*kruṅ kruṅ ts‘e riṅ*) pecking at some peaches (*k‘am-bu*) that are planted in a jar, and a pair of *bse-ru*. Though apparently inspired by the deer, which is the emblem of the Chinese God of Longevity, their outlines considerably differ from the latter, and approach the Tibetan notion of the appearance of a *bse-ru;*[1] but, curiously enough, they are without any horns. There can be little doubt, accordingly, that in recent times, when the rhinoceros had almost vanished from the memory of the Tibetan people, the word *bse-ru* was transferred to a species of deer or antelope; and, as the ancient tradition of the *bse-ru* being a single-horned animal had persisted through the centuries, the single horn, in popular imagination, was fixed on the antelope. When we inquire why it was just the antelope, and not any other animal on which the idea of a unicorn was projected, the story of Ekaçṛiṅga presents itself again as the happiest solution. We know that this legend, in a Tibetan translation, has been incorporated in the Kanjur; and A. Schiefner[2] has translated it from this version. It is likewise extant in Kshemendra's Avadānakalpalatā, of which a literal versified rendering, and an abridged prose edition made for children by order of the Fifth Dalai Lama, exist in the Tibetan language. This plain version has rendered the story immensely popular among Tibetans; and, as pointed out, it is current also in a dramatized form. The Tibetan mask of Ekaçṛiṅga (Plate X) is equipped with an unmistakable antelope-horn.[3] The psychological process is therefore quite clear. The rhinoceros was gradually forgotten by the people, the word *bse* or *bse-ru* of this meaning continued in literature; the people retained the recollection of its being a single-horned animal, and in their attempts at finding this creature, the legend of Hermit Single-Horn, the son of an antelope or gazelle, flashed into their minds; so that the unicorn *bse-ru* was finally identified with a species of antelope named for this reason *bse-ru*. This unicorn *bse-ru* we now recognize also in the Chinese drawing of *Chêng lei pên ts'ao* (Fig. 13). Since the proof is now established that the interaction and intermingling of deer and rhinoceros have taken place in China, in Tibet, and in the West with the first conspicuous allusion in the *Cyranides*,[1] and that this process of adjustment and affiliation has radiated from the Indian legend of Single-Horn born from a gazelle, we are justified in concluding that the foundation, or at least the commencement, of this transformation, must have arisen in India. The development of the matter in Tibet shows sufficiently that Ekaçriṅga is disguised also under our Chinese illustration. So much about the latter.

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[1] The Manchu has the artificial formation *śengkitu*, and three other words besides,— *śacintu*, *tontu*, and *tubitu* (see SACHAROV, Manchu-Russian Dictionary, p. 734),—for the designation of this unicorn. It will be remembered that the term *shĕn yang* occurs in *Hou Han shu* in defining the unicorn *hiai chai* (p. 115, note 2).

[2] The Mongols have adopted *seru* as a loan-word from Tibetan in the sense of "rhinoceros," as stated by KOVALEVSKI and GOLSTUNSKI in their Mongol dictionaries; but they take the word also in the sense of a "deer," as shown by the Mongol translation of the Tibetan medical work translated into Russian by A. POẒDNĂYEV (Vol. I, p. 288). The Mongol equivalent of Tibetan *bse-ru* and Chinese *si kio* is here *bodi gürügäsün* ("the animal of the bodhi," Sanskrit *bodhimṛiga*); that is, the gazelle. Besides, the Mongols have a seemingly indigenous word for "rhinoceros," — *kiris*, *keris*, or *kers-un ăbăr*.

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[1] My explanation is based on the interpretation of this woodcut given me by an intelligent Lama. A. Grünwedel, in his Russian Description of the Lamaist Collection of Prince Uchtomski (*Bibl. Buddhica*, No. 6, p. 26), has figured a similar woodcut, but without explanation. The God of Longevity bears the Mongol legend *Tsaghan Åbughān* ("The White Old Man"), who is certainly, as stated on p. 117, a national Mongol deity; but from an iconographic point of view, as he appears in Grünwedel's drawing, he is nothing but a copy of the well-known Chinese God of Longevity.

[2] In Ralston, Tibetan Tales, p. 253.

[3] On the lid of a Tibetan censer in the Field Museum (Cat. No. 122,522) are represented the full figures of two gazelles opposite and turned away from each other (the wheel of the law being placed between them), the well-known Buddhist motive symbolizing Buddha's first sermon in the Deer-Park (Grünwedel, Buddhist Art in India, p. 143). One of these is provided with a single horn on its forehead; the other, apparently conceived as the doe, is hornless. The former seems suggested again by a reminiscence of Ekaçṛiṅga, but it is not known to me whether the Tibetans would name it *bse-ru*. Other Tibetan censers are surmounted by a monster of Chinese style, showing a horn on its nose and another on its forehead,— manifestly derived from the two-horned rhinoceros.

A most interesting psychological parallel to the representations of the rhinoceros in China is formed by the ostrich. We now know from the reproductions of Chavannes[2] that in the T'ang period the ostrich was chiselled in stone in a very naturalistic manner on the imperial burial-places (Fig. 15).[3]

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[1] A counterpart of the rhinoceros of cervine character occurs also among the Arabs. In Ethiopic, the word *charîsh* corresponds to the *monokeros* of the Septuaginta (Job, xxxix, 9), and in all probability signifies the "rhinoceros." According to Qazwînî, *charîsh* is an animal of the size of a ram, of great strength and swiftness, with a single horn on its forehead like the horn of the rhinoceros (*karkadan*). Some Arabic lexicographers even take it for a marine animal, others identify it directly with the rhinoceros. Hommel (Die Namen der Säugetiere bei den südsemitischen Völkern, p. 333, Leipzig, 1879), to whom this information is due, regards the Arabic word as a loan from Ethiopic. Damîrî, in his Lexicon of Animals, avails himself of this word in translating the text of the *Physiologus* regarding the unicorn (K. Ahrens, Das Buch der Naturgegenstände, p. 43). What escaped Hommel is the fact that Cosmas Indicopleustes (McCrindle, Ancient India as described in Class. Lit., p. 157) states that the Ethiopians, in their language, call the rhinoceros *arou* or *harisi*. G. Jacob (Studien in arabischen Geographen IV, p. 166, Berlin, 1892) holds that Qazwînî is the only Arabic author to discriminate between *charîsh* and the rhinoceros, and identifies the former with the Saiga-antelope of southern Russia. The rendering "unicorn" by the Seventy and the English Bible is erroneous. The Hebrew word, thus translated, is *reem*, corresponding to Assyrian *rîmu*. It is now generally interpreted as a wild buffalo, and on the basis of Assyrian monuments is ingeniously identified with *Bos primigenius* by J. U. Dürst (Die Rinder von Babylonien, pp. 8–11, Berlin, 1899). The animal, called in Hebrew *behemoth* (Job, xl, 15–24), and formerly taken for the rhinoceros (p. 83), is the hippopotamus of the Nile. The Bible does not mention the rhinoceros or the unicorn.

[2] *Mission archéologique*, Nos. 458, 459, 472, 481.

[3] These ostriches belong to the very best ever executed in the history of art. They are much superior to any representations of the bird by the Egyptians (O. Keller, Die antike Tierwelt, Vol. II, p. 170), the Assyrians (P. S. P. Handcock, Mesopotamian Archaeology, p. 307), and the classical nations (Imhoof-Blumer and O. Keller, Tier- und Pflanzenbilder auf Münzen und Gemmen, Plates V, 52; XXII, 33–36).

It was the great general and explorer Chang K'ien, the first modern Chinese, who during his peregrinations to the west, among many other novel things, discovered also the ostrich for his compatriots. After he had negotiated his treaties with the countries of the west, the King of Parthia (An-si) sent an embassy to the Chinese Court and presented large bird's eggs,[1] which most probably were ostrich eggs. A live specimen (or specimens) of the "large bird of T'iao-chi" was despatched as tribute from the same country in 101 A.D., and termed in China "Parthian bird."[2]

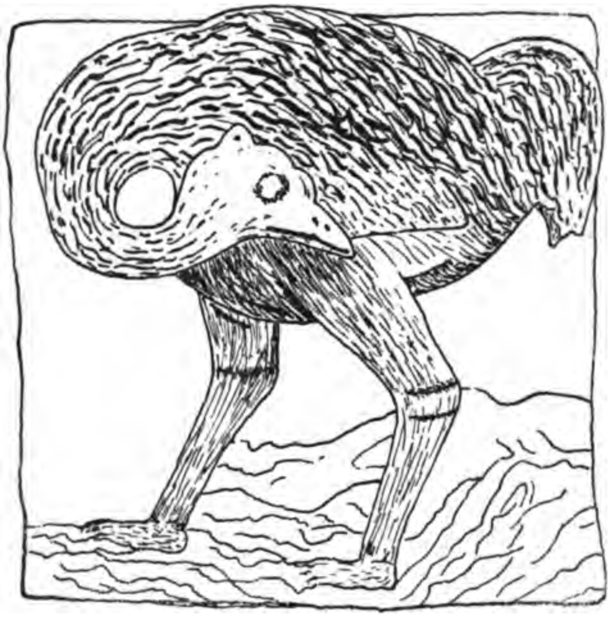

FIG. 15.
Ostrich sculptured in Stone, T'ang Period (Sketch after Chavannes, Mission, No. 472).

They are not made after any western artistic models, but constitute invincible proof for the fact that the Chinese artists in the T'ang era observed and studied nature, and worked after natural models. This case may be recommended for due consideration to the adherents of the preconceived dogma that all Chinese art is copied from that of the west, and that no art is possible outside of the sanctum of classical art.

[1] *Shi ki*, Ch. 123, p. 6; HIRTH, China and the Roman Orient, p. 169. FORKE (*Mitteilungen des Seminars*, Vol. VII, 1904, p. 139) wrongly says that the *Shi ki* mentions "large birds (ostriches) with eggs as large as earthen pots as a peculiar feature of T'iao-chi;" this is not in the text of the *Shi ki*, which speaks only of large bird's eggs, but it is found in *Ts'ien Han shu* (Ch. 96 A, p. 6 a). The trade in ostrich eggs in the west is of very ancient date (O. KELLER, *l. c.*, p. 168).

[2] *Hou Han shu*, Ch. 118, p. 9; CHAVANNES, *T'oung Pao*, 1907, p. 178. M. CHAVANNES advances the theory that the Chinese erroneously applied to the ostrich the

It was styled also "great horse bird."[1] Its resemblance to the camel was emphasized, and hence the name "camel-bird" was formed. Living ostriches were sent to China again in the T'ang period. In 650 Tokhāra offered large birds seven feet high, of black color, with feet resembling those of the camel, marching with outspread wings, able to run three hundred *li* a day, and to swallow iron; they were styled camel-birds.[2] The T'ang artists, accordingly, were in a position to witness and to study live specimens of the bird; and the fact that they really did so leaks out in the realistic high-relief carvings referred to above. But what do we find among the latter-day draughtsmen who endeavored to illustrate the creature for books?

Fig. 16 shows the woodcut with which the *Pên ts'ao kang mu* of Li Shi-chên is adorned. Bretschneider (*l. c.*), in a somewhat generous spirit, designated it as "a rude, but tolerably exact drawing of the camel-bird." Forke[3] holds that this ostrich is pictured like a big goose, but with the feet of a mammal; and he comes far nearer to the truth. Li Shi-chên, born in K'i chou in the province of Hu-pei, spent his life-

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name "bird of Parthia" (An-si, Arsak), but that in fact these birds originated from T'iao-chi, that is, Desht Misan or Mesene, where ruled Arabic princes who had all facilities for obtaining ostriches from Arabia. This theory does not seem necessary to me. As already observed by Bretschneider (*Notes and Queries*, Vol. IV, p. 53; and Mediæval Researches, Vol. I, pp. 144–145), the ostrich is described in *Wei shu* as a bird indigenous to Persia (compare also *Sui shu*, Ch. 83, p. 7 b; *Pei shi*, Ch. 97, p. 8), and is again mentioned in the T'ang Annals as a Persian bird; there is, on the other hand, the testimony of the Persian authors and of Xenophon (*Anabasis*, I, 5), who saw the bird on the banks of the Euphrates; and up to the present time, ostriches are met with, though not frequently, in western Asia. Handcock (*l. c.*, p. 25) observes that the ostrich appears in Mesopotamian art at a late period, though in Elam rows of ostriches are found depicted on early pottery, closely and inexplicably resembling the familiar ostriches on the pre-dynastic pottery of ancient Egypt; it sometimes, however, assumes a conspicuous position in the embroidery of an Assyrian king's robe, and is found also on a chalcedony seal in Paris. Further references to Assyrian representations are given by O. Keller (*l. c.*, pp. 172, 594). In ancient Syria, the ostrich is well attested by the interesting description in Job (xxxix, 13–18), — Moses prohibited the flesh of the bird as unclean food,— and by reliefs at Hierapolis of Roman times. It further occurs in the Syrian version of the *Physiologus*. Brehm (Tierleben, Vol. III, p. 692) sums up, "In Asia, the area of the habitat of the ostrich may formerly have been much more extended than at present; but even now, as established by Hartlaub with as much diligence as erudition, it occurs in the deserts of the Euphrates region, especially the Bassida and Dekhena, in all suitable localities of Arabia, and finally in some parts of *southern Persia*. Vámbéry even learned that it is still sometimes found on the lower course of the Oxus, in the region of Kungrad (?), and is named there camel or coffer bird." Also in the Encyclopædia Britannica (Vol. XX, p. 362) it is said, "It is probable that it still lingers in the wastes of Kirwan in eastern Persia, whence examples may occasionally stray northward to those of Turkestan, even near the lower Oxus."

[1] *Ts'ien Han shu*, Ch. 96 A, p. 6 b. In this passage the bird is noticed as a native of Parthia, and commented on by Yen Shi-ku.

[2] Chavannes, Documents, p. 156. In the period K'ai-yüan (713–741) ostrich eggs were sent from Sogdiana (*ibid.*, p. 136).

[3] *L. c.*, p. 138.

time as magistrate of the district of P'êng-k'i in the prefecture of T'ung-ch'uan, province of Sze-ch'uan. The chances are that he had never seen the sculptures of ostriches in the mausolea of the T'ang emperors near Li-ts'üan, Shen-si Province; but, be this as it may, his woodcut proves that the T'ang tradition of the representation of the ostrich was wholly unknown to him, and moreover, that he himself had never beheld an ostrich. We have no records to the effect that ostriches were transported to China during the Ming period; and they were then probably known merely by name. Li Shi-chên's production is simply a reconstruction based on the definitions of the texts ("marching with outspread wings, feet of a camel," etc.); the only exact feature is the two toes, which are mentioned also in the older descriptions of the bird; everything else, notably the crane's head, is absurd, and a naturalist of the type of Bretschneider should have noticed this.

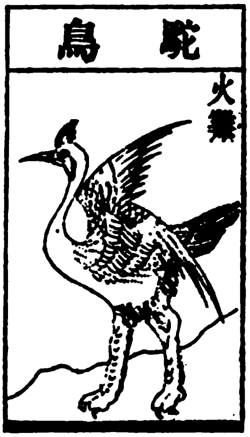

FIG. 16.
Ostrich (from *Pên ts'ao kang mu*).

In the great cyclopædia *T'u shu tsi ch'êng*, published in 1726, we find a singular illustration of the ostrich, which is reproduced in Fig. 17 as an object-lesson in Chinese psychology. This accomplishment must open every one's eyes: here we plainly see that the illustrator had not the slightest idea of the appearance of an ostrich, but merely endeavored, with appalling result, to outline a sketch of what he imagined the "camel-bird" should look like. He created a combination of a camel and a bird by illustrating the bare words, as they struck his ears, without any recourse to facts and logic; he committed the logical blunder (so common among the Chinese from the days of the Sung period) of confounding a descriptive point of similarity with a feature of reality. All Chinese texts are agreed on the point that the bird is just like a camel, or conveys that impression. This case is most instructive in disclosing the working of the minds of the recent Chinese illustrators, and in exhibiting the value due to their productions. It would not do in the present case to deny that this figure is intended for an ostrich, to define it as a new animal species, a "bird-shaped biped camel" (something like an *Avi-camelus bipes*), and to conclude that the Chinese term *t'o niao* does not denote the ostrich. On the contrary, we have to conclude that illustrations of this character are out and out valueless for our scientific purposes, that definitions of an animal cannot be deduced from them, but that all reasoning on the nature of the respective animal

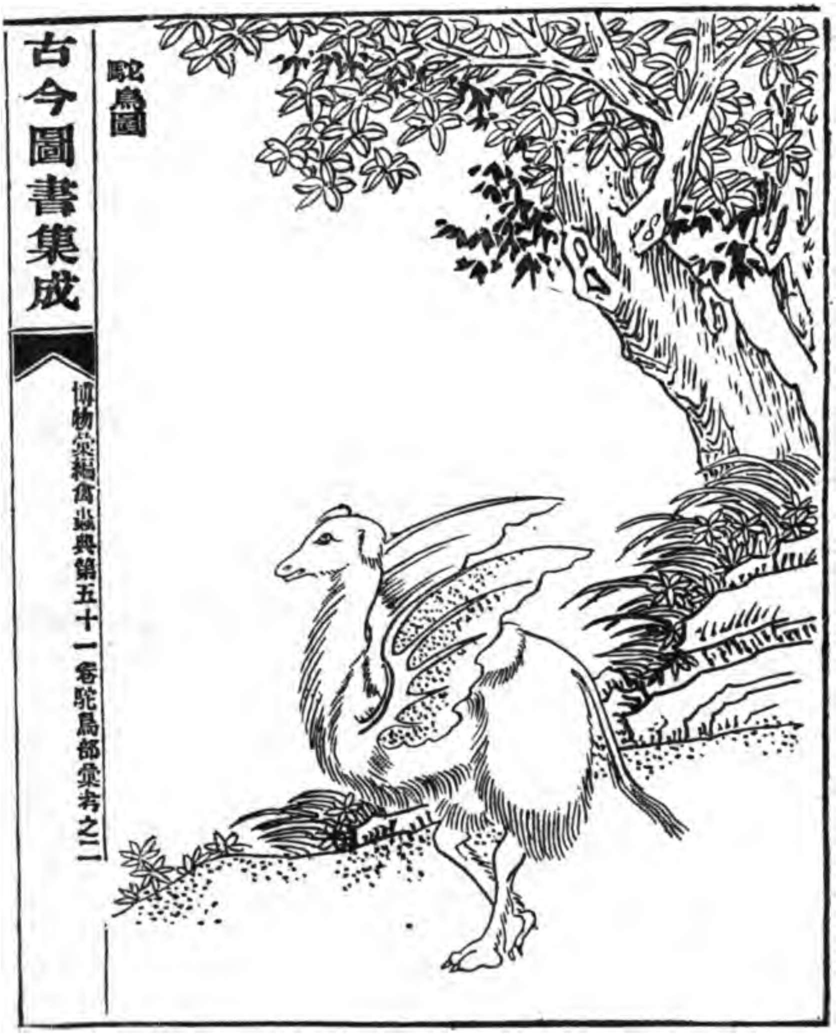
古今圖書集成
駝鳥圖
博物彙編禽蟲典第五十一卷駝鳥部彙考之二

Fig. 17.
Alleged Ostrich (from *T'u shu tsi ch'êng*).

can be based solely on the texts.[1] The illustrations are posterior in time and mere accessories, and, even if fairly sensible, of sheer secondary importance; in each and every case, however, if utilized as the basis for any far-reaching conclusion, their history, sources, and psychological foundation must be carefully examined. Another impressive lesson to be derived from the case of the ostrich is that China, which by virtue of a widely accepted school opinion appears to us as the classical soil of ultra-conservative perseverance of traditions, is very liable also to lose traditions, and even rather good ones. The excellent ostrich representations of the T'ang have not been perpetuated, but have remained as isolated instances. Indeed, they seem to have remained unknown to Chinese artists, archæologists, and naturalists, and hidden away in seclusion and oblivion until discovered by M. Chavannes. It is this very China unknown to the Chinese, which, as research advances, will become our most attractive subject of study.

We referred above (p. 100) to the fact that the ancient illustrations to the *Erh ya* are lost, and that Kuo-P'o's sketches of the rhinoceros may have been nearer to the truth. In now raising the question whether any representations of the animal are handed down in the ancient monuments of China, we naturally remember the primeval form of writing that mirrors the stage of her primitive culture. The celebrated Catalogue of Bronzes, the *Po ku t'u lu*, published by Wang Fu in the period Ta-kuan (1107–1111), has preserved to us (Ch. 9, p. 23) two ancient symbols which are veritable representations of the single-horned rhinoceros *se* (Fig. 18). They are placed on the ends of a handle of a bronze wine-kettle attributed to the Shang dynasty (B.C. 1766–1154). The explanatory text runs as follows: "The two lateral ears of the vessel are connected by a handle, on which are chased two characters in the shape of a rhinoceros (*se*). When it is said in the *Lun yü* that 'a tiger and rhinoceros escape from their cage,'[2] it follows that the rhinoceros is

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[1] And these must certainly be handled with a critical mind, as, for instance, a glance at the chapter "Ostrich" in the *T'u shu tsi ch'êng* will convince one. The first extract there given from the *Ying yai shêng lan* of 1416 deals with the "fire-bird" of Sumatra, which is the cassowary (see GROENEVELDT, in *Miscell. Papers relating to Indo-China*, Vol. I, pp. 198, 262). *Mo k'o hui si*, a work written by P'êng Ch'êng in the first half of the eleventh century (BRETSCHNEIDER, Bot. Sin., pt. 1, p. 174), is quoted as making a contribution to the subject in question, because a bird able to eat iron and stone is mentioned there; this bird, however, called *ku-t'o*, occurs in Ho-chou, the present Lan-chou fu in Kan-su, is built like an eagle, and over three feet high! Accordingly we here have a wrong association of ideas, and the subject has nothing to do with the ostrich. The editors of the cyclopædia blindly follow the uncritical example of Li Shi-chên, who embodied the same in his notes on the ostrich. Finally, Verbiest's *K'un yü t'u shuo* is laid under contribution, as he describes the "camel-bird" of South America. This is the Rhea belonging to the Ratite family, but distinguished from the true ostrich by its possession of three toes.

[2] LEGGE, Chinese Classics, Vol. I, p. 306; and above, p. 74, note 4.

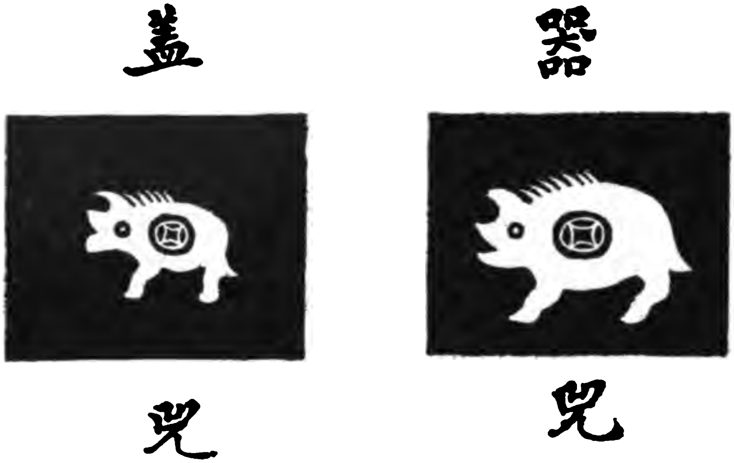

FIG. 18.
Single-Horned Rhinoceros on a Bronze Kettle attributed to Shang Period (from *Po ku t'u lu*, edition of 1603).

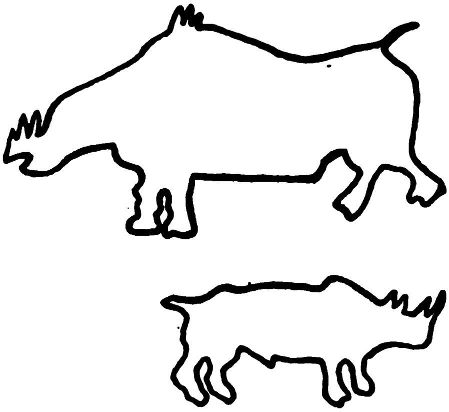

FIG. 19.
Bushman Sketches of Rhinoceros (from E. Cartailhac and H. Breuil, La caverne d'Altamira, pp. 180, 189).

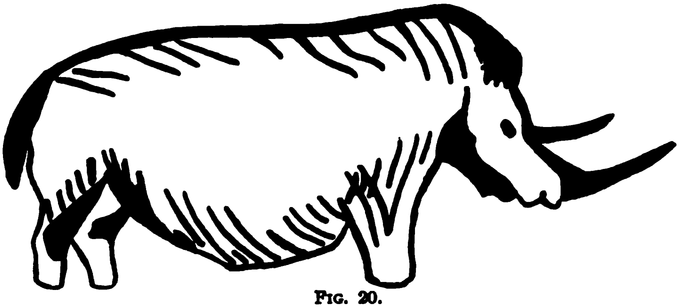

FIG. 20.
Red Drawing of a Two-Horned Rhinoceros, from Font-de-Gaume (after Capitan and Breuil).

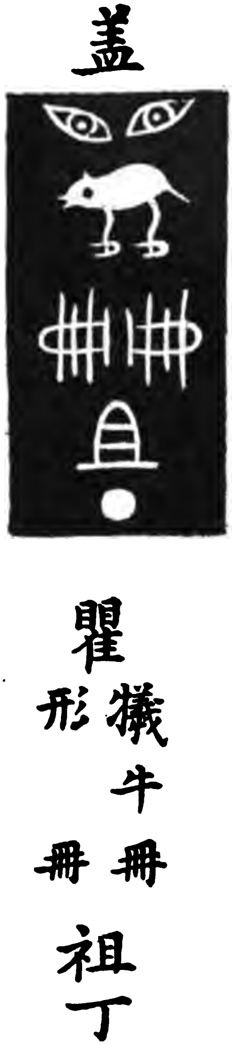

FIG. 21.
Inscription on Bronze Kettle attributed to Shang Period, showing Pictorial Form of Sacrificial Bull (from *Po ku t'u lu*).

not a tame animal. Indeed, it inflicts injury on man; and for this reason the ancients availed themselves of it to fine a person a cup of wine, which is expressed by the phrase 'to raise the goblet of rhinoceros-horn.'[1] This goblet receives its name from the rhinoceros, and so it is proper also that there should be wine-kettles with the emblem of the rhinoceros. On the two ends of the handle of this vessel is pictured a rhinoceros with head and body complete, the latter having the shape of a glutton (*t'ao t'ie*). This certainly indicates that it symbolizes a warning. In this manner all vessels were decorated during the Shang dynasty, and it is by such symbolic forms that they are distinguished from those of the Chou." Whatever the rough character of these two sketches transmitted by the *Po ku t'u lu* may be,[2] the single-horned rhinoceros is here clearly outlined with a naïve and refreshing realism, such as could be spontaneously produced only by the hand of primitive man, who with a few forceful outlines recorded his actual experience of the animal. Here we do not face the narrow-breasted academic and philological construction of the scholars of the Sung period, but the direct and vigorous impression of the strong-minded hunter of past ages, who was formed of the same stuff as the Bushman of southern Africa and palæolithic man living in the caves of Spain and France. No bridge spans the chasm yawning between the Shang and Sung productions. The Shang rhinoceros breathes the same spirit as its companions on the rock paintings of the Bushman (Fig. 19), and in the palæolithic cave of Font-de-Gaume in France (Fig. 20). The general form of the animal is well grasped in the Chinese sketch, and the shape of the horn is correctly outlined. For the sake of comparison, and in order to show that the primitive Chinese man knew very well how to discriminate between a rhinoceros and an ox, the contemporaneous symbol for the sacrificial bull (*hi niu*), and designs of recumbent oxen (explained as such in the *Po ku t'u lu*) on the lid of a bronze vessel, are here added (Figs. 21 and 22). We arrive at the result, which will be corroborated by other evidence, that in the earliest stage of Chinese culture the animal *se* was the single-horned rhinoceros.[1]

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[1] Quotation from *Shi king* (see LEGGE, Chinese Classics, Vol. IV, p. 233). The rhinoceros-horn goblets are discussed below, p. 167.

[2] Another cruder and more conventionalized symbol of the rhinoceros *se*, in which, however, the single horn is duly accentuated, is figured in the same work (Ch. 1, p. 25 b), as occurring in the inscription on a round tripod vessel (*ting*) attributed to the Shang period.

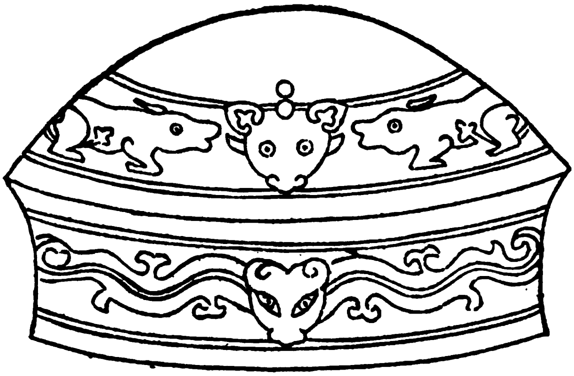

FIG. 22.
Lid of Bronze Kettle attributed to Shang Period, with Designs of Recumbent Oxen (from *Po ku t'u lu*).

Before plunging into the Chinese sources relative to the rhinoceros, it will be well to remember that all living species of rhinoceros are by most naturalists referred to a single genus, which is found living in Africa and south-eastern Asia, while formerly it was widely distributed over the entire Old World (with the exception of Australasia), ranging as far north as Siberia.[2] Three species exist in Asia, — *Rhinoceros unicornis*, the great one-horned rhinoceros, at the present day almost entirely restricted to the Assam plain, but formerly extensively distributed over India;[3] *Rhinoceros sundaicus*, called also the Javan rhinoceros, the smaller one-horned rhinoceros, found in parts of eastern Bengal (the Bengal Sunderbans near Calcutta), in Assam, throughout Burma, the Malay Peninsula, Sumatra, Java, and Borneo; and *Rhinoceros* (or *Dicerorhinus*) *sumatrensis*, the Asiatic two-horned rhinoceros, rare in Assam, ranging from there to Burma, Siam, the Malay Peninsula,

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[1] The later developments of the early forms of the symbol *se* may be viewed by those who are debarred from Chinese sources in F. H. CHALFANT, Early Chinese Writing, Plate II, No. 17 (*Memoirs Carnegie Museum*, Vol. IV, No. 1, Pittsburgh, 1906). According to a communication of the late Mr. CHALFANT (Dec. 18, 1913), the ancient bone inscriptions twice reveal a character which may be identified with the word *se*, while the character for *si* has not yet been traced in them.

[2] Hornless species formerly occurred in North America, where the group has existed since the latter part of the Eocene period.

[3] Chiefly after W. T. BLANFORD, The Fauna of British India; Mammalia, pp. 471–477.

Sumatra, and Borneo.[1] Judging from this remarkable case of discontinuous distribution[2] and from historical records, there is every reason to believe that in ancient times this animal, like all the large mammals now facing extinction, was distributed over a much larger geographical area; and this fact is fully confirmed by palæontological research, as well as by the records of the Chinese.

For the purpose of our inquiry it should be particularly borne in mind that it is in the territory of Assam where we meet the three species together. "The Imperial Gazetteer of India"[3] states, in the chapter on Assam, "Rhinoceros are of three kinds: the large variety (*unicornis*), which lives in the swamps that fringe the Brahmaputra; the smaller variety (*sondaicus*), which is occasionally met with in the same locality; and the small two-horned rhinoceros (*sumatrensis*), which is now and again seen in the hills south of the Surmā Valley, though its ordinary habitat is Sumatra, Borneo, and the Malay Peninsula." Assam is inhabited by numerous tribes, a large portion of which ranges among the Indo-Chinese family. What now holds good for Assam, as will be recognized from a survey of Chinese sources, two millenniums and more ago was valid for the south-western and southern parts of China, the Tibeto-Chinese borderlands, and Indo-China in its total range; in short, the historical fact will be established that in the past the rhinoceros in its two main varieties, the single-horned and two-horned, had occupied the whole territory of south-eastern Asia.

The greater part of the knowledge possessed by the Chinese in regard to the rhinoceros has been digested by Li Shi-chên in his materia medica *Pên ts'ao kang mu* (Ch. 51 A, p. 5) completed in 1578 after twenty-six years' labor. He first quotes a number of authors beginning from the fifth century, and then sums up the argument in his own words. This discourse is also of value for zoögeography, in that it contributes materially to the possibility of reconstructing the early habitats of the rhinoceros in China. The text of this work is here translated *in extenso*, but rectified and supplemented from the materia medica of the Sung period, the *Chêng lei pên ts'ao*, first printed in 1108.[4]

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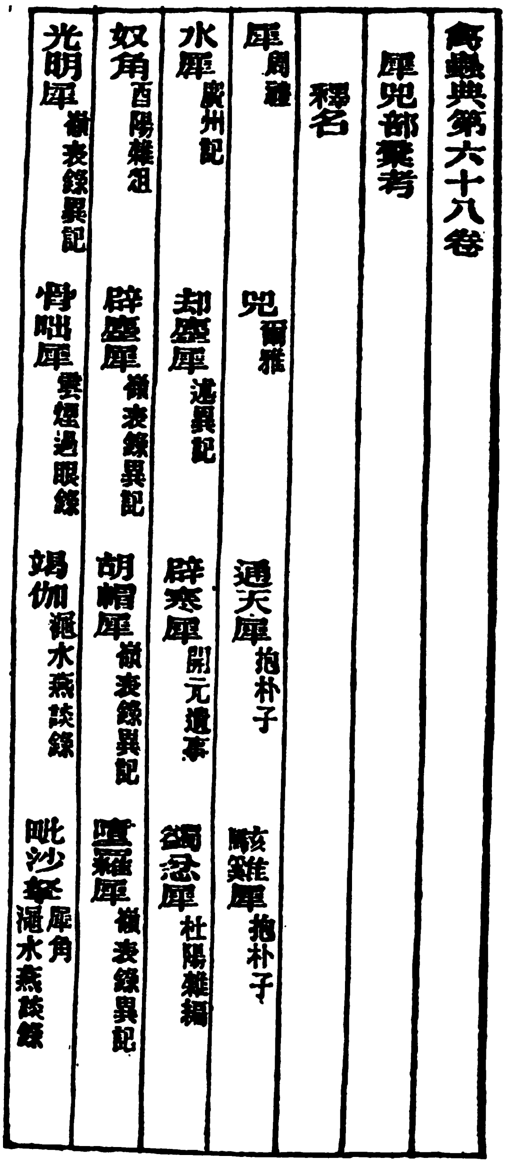
[1] Al-Bērūnī (973–1048) states that the rhinoceros existed in large numbers in India, more particularly about the Ganges (Sachau, *l. c.*, Vol. I, p. 203). In the sixteenth century it occurred in the western Himālaya and also in the forests near Peshāwar (Yule and Burnell, Hobson-Jobson, p. 762). Linschoten found it in great numbers in Bengal (*ibid.*, p. 1); so also Garcia Ab Horto (*l. c.*, p. 66): multos in Cambaya Bengala finitima, et Patane inveniri tradunt. Abul Fazl Allami (1551–1602), in his *Ain I Akbari* written in 1597 (translation of H. S. Jarrett, Vol. II, p. 281, Calcutta, 1891), mentions the occurrence of the rhinoceros among the game in the Sarkár of Sambal (near Delhi).

[2] Compare E. Heller, The White Rhinoceros, p. 39.

[3] Vol. VI, p. 20 (Oxford, 1908).

[4] See *T'oung Pao*, 1913, p. 351.



禽蟲典第六十八卷

犀兕部彙考

釋名

犀（周禮） 兕（爾雅） 通天犀（抱朴子） 駭雞犀（抱朴子）

水犀（廣州記） 却塵犀（述異記） 辟寒犀（開元遺事） 蠲忿犀（杜陽雜編）

奴角（酉陽雜俎） 辟塵犀（嶺表錄異記） 胡帽犀（嶺表錄異記） 墮羅犀（嶺表錄異記）

光明犀（嶺表錄異記） 骨咄犀（雲煙過眼錄） 竭伽（澠水燕談錄） 毗沙拏（犀角澠水燕談錄）

Other texts of importance apt to throw light on the matter have been added from the *T'u shu tsi ch'êng* and several other works, so that the result is a fairly complete digest of what Chinese authors of the post-Christian era have to say about the rhinoceros and its horn. After this survey, we shall turn to the times of early antiquity, and discuss the subject in the light of such information as has been handed down to us from those days.

Li Shi-chên opens his discourse on the rhinoceros with the explanation of the name. "The symbol for the word *si* still has in the seal character *chuan wên* the form of a pictograph,[1] and is the name for the female rhinoceros. The *se* is styled also 'sand rhinoceros' (*sha si*). The *Erh ya i*[2] says that the words *se* and *tse* (female) approach each other in sound like the two words *ku* ('ram,' No. 6226) and *ku* ('male'). In general, *si* and *se* are one and the same. The ancients were fond of saying *se*, the people of subsequent times inclined toward the word *si*. In the northern dialects the word *se* prevails, in the southern dialects the predilection is for *si*. This is the difference between the two. In Sanskrit literature the rhinoceros is called *khaḍga*."[3]

Li Shi-chên then proceeds to quote the ancient work *Pie lu*,[4] which makes the following important statement in regard to the former localities where the rhinoceros occurred: "The habitat of the rhinoceros

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[1] This is indeed the case in the *Shuo wên* (see p. 92). The names of the rhinoceros and the various kinds of its horn are here reproduced from *T'u shu tsi ch'êng* (p. 134).

[2] An appendix to the *Erh ya* by Lo Yüan of the twelfth century (BRETSCHNEIDER, Bot. Sin., pt. 1, p. 37).

[3] Written with Nos. 1456 and 1558 (*k'et-ga*); compare EITEL, Hand-book of Chinese Buddhism, p. 76. (Other Sanskrit words for "rhinoceros" are *gaṇḍa*, *gaṇḍaka*, *gaṇḍânga*.) The work *Sheng shui yen t'an lu*, written by Wang P'i-chi about the end of the eleventh century (WYLIE, Notes, p. 195), seems to be the first to impart this Sanskrit name (see the Chinese text opposite); it further gives a Sanskrit word for the horn in the Chinese transcription *pi-sha-na* corresponding to Sanskrit *vishâṇa* ("horn"). The latter and the word *khaḍga* were among the first Sanskrit words in Chinese recognized by Abel Rémusat (see S. JULIEN, Méthode, p. 3).

[4] The *Pie lu* is not identical with the *Ming i pie lu*, as first stated by BRETSCHNEIDER (Bot. Sin., pt. 1, p. 42), but later rectified by him (in pt. 3, p. 2). It is an independent work, which must have existed before the time of T'ao Hung-king, and which was known to the latter and commented on by him. This is quite clear in the present case, as Li Shi-chên first introduces the *Pie lu*, and then proceeds, "T'ao Hung-king says." And since the latter starts with the phrase "at present," it is apparent that he had the words of the *Pie lu* before his eyes, and gave his definition in distinction from the older work. This is also proved by the text of the *Chêng lei pên ts'ao* published in 1108 by the physician T'ang Shên-wei (edition of 1523, Ch. 17, fol. 21), where the two quotations are separated and marked by type of different size. As in Bretschneider's opinion nearly all the geographical names occurring in the *Pie lu* refer to the Ts'in (third century B.C.) or Han periods, although some of them can be traced to the Chou dynasty (B.C. 1122–249), the above passage surely relates to a time antedating our era by several centuries; and it goes without saying, that as a matter of fact, in the age of the Chou and at a far earlier date, the two-horned rhinoceros must have been a live citizen in the south-western parts of China.

(*si*) is in the mountains and valleys of Yung-chʻang and in Yi-chou;[1] Yung-chʻang is the southern part of the present country of Tien (Yün-nan)."[2]

The next author invoked by Li Shi-chên is Tʻao Hung-king (452–536), a celebrated adept of Taoism and a distinguished physician, author of the *Ming i pie lu*, a treatise on materia medica.[3] He states, "At present the rhinoceros (*si*) inhabits the distant mountains of Wu-ling,[4] Kiao-chou,[5] and Ning-chou.[6] It has two horns; the horn on the forehead is the one used in fighting.[7] There is a kind of rhinoceros styled 'communicating with the sky' (*tʻung tʻien*), whose horn is intersected by a white vein running clear through from the base to the tip; the night dew does not moisten it. It is employed as a remedy, whereby its wonderful properties are tested. In the opinion of some, this is the horn of the water-rhinoceros, which is produced in the water.[8] The Annals of the Han Dynasty speak of the horn of 'the rhinoceros frightening fowl' (*hiai ki si*): when it was placed in the rice that served as food for the chickens, they were all scared and did not dare to peck;

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[1] PLAYFAIR, The Cities and Towns of China, No. 8596 (2d ed., No. 7527, 1). In the Han period, Yi-chou was the name of a province occupying the territory of the present province of Sze-chʻuan, a part of Kuei-chou and Yün-nan (BRETSCHNEIDER, Bot. Sin., pt. 3, p. 565), while the southern part of Yün-nan is understood by the designation Yung-chʻang. The *Pie lu*, accordingly, locates in south-western China the rhinoceros *si*, which, as follows from the comment of Tʻao Hung-king, is the two-horned species.

[2] This last clause is not contained in the text of the *Chêng lei pên tsʻao*, and is doubtless a later comment, presumably derived from Tʻao Hung-king's edition of the *Pên tsʻao king*, which is listed in the Catalogue of the Sui Dynasty, and according to Bretschneider's supposition, embraced likewise the text of the *Pie lu*.

[3] His biography is in *Nan shi* (Ch. 76, p. 4 b) and *Liang shu* (Ch. 51, p. 12).

[4] PLAYFAIR, No. 8112 (2d ed., No. 7080): district forming the prefectural city of Chʻang-tê, Hu-nan Province.

[5] Northern part of the present Tonking (see HIRTH and ROCKHILL, Chau Ju-kua, p. 46).

[6] PLAYFAIR, No. 5239, 2 (4672, 2): in Lin-an fu, Yün-nan Province. Under the Tsin it was a province comprising Yün-nan and part of Kuei-chou (compare *Hua yang kuo chi*, Ch. 4, p. 1, ed. of *Han Wei tsʻung shu*).

[7] Thus the two-horned (so-called Sumatran) rhinoceros is here clearly mentioned.

[8] The rhinoceros is fond of spending the hot hours of the day immersed in water, and thence the Chinese designation "water-rhinoceros" may take its origin. In this position particularly, the animal calls to mind the water-buffalo. In ancient times it was therefore dreaded as being able to overturn boats, which is quite believable; and soldiers crossing a river were encouraged to prompt action by their commander shouting the name of the animal (CHAVANNES, Les Mémoires historiques de Se-ma Tsʻien, Vol. I, p. 225, Vol. IV, p. 37; FORKE, Lun-Hêng, pt. II, p. 322; according to FORKE, the reading of the text is *tsʻang kuang*, but as quoted in *Tʻu shu tsi chʻêng* and *Pʻei wên yün fu* it is *tsʻang se*, as in *Se-ma Tsʻien*). The water-rhinoceros (*shui si*) is mentioned in *Kuang chou ki* (see BRETSCHNEIDER, Bot. Sin., pt. 1, No. 377) as occurring in the open sea off the district of Pʻing-ting, resembling an ox, emitting light when coming out of, or descending into, the water, and breaking a way through the water (quoted in *Tʻu shu tsi chʻêng*).

when it was placed on the roof of a house, the birds did not dare to assemble there.[1] There is also the horn of the female rhinoceros, which is very long, with patterns resembling those of the male, but it is not fit to enter the pharmacopoeia."[2]

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[1] The allusion to the *hiai ki si* occurs in Ch. 108 of *Hou Han shu* (compare CHAVANNES, Les pays d'Occident d'après le Heou Han Chou, *T‘oung Pao*, 1907, p. 182; and HIRTH, China and the Roman Orient, p. 79), where this kind of horn is ascribed to the country of Ta Ts‘in (the Roman Orient). The legend given in explanation as above is derived from the famous Taoist writer Ko Hung, who died about 330 A.D.; and it is not accidental that the Taoist T‘ao Hung-king here copies his older colleague, for the legend is plainly Taoistic in character. It is quoted in the commentary to *Hou Han shu*, but not in the text of the Annals. The view of Hirth, that it has arisen in consequence of a false etymology based on the Chinese characters transcribing a foreign word, seems to me unfounded. First, as Chavannes remarks, the foreign word supposed to be hidden in *hiai-ki* has not yet been discovered, and in all probability does not exist. Second, as will be seen from *P‘ei wên yün fu* (Ch. 8, p. 87 b), the term *hiai ki si* does not occur in *Hou Han shu* for the first time, but is noted as early as the *Chan kuo ts‘e* at the time of Chang I, who died in B.C. 310, when the King of Ch‘u despatched a hundred chariots to present to the King of Ts‘in fowl-scaring rhinoceros-horns and jade disks resplendent at night (*ye kuang pi*). It is certainly somewhat striking to meet here these two names, which are identical with those in *Hou Han shu*, and occur there close together; and it cannot be denied that the passage of *Chan kuo ts‘e* might be an interpolation. Huai-nan-tse, who died in B.C. 122, alludes to a rhinoceros-horn frightening foxes (*si kio hiai hu*, quoted in *P‘ei wên yün fu*, *l. c.*, p. 89 a, "when placed in the lair of a fox, the fox does not dare return"), which is a case analogous in word and matter to the fowl-frightening horn. These notions must be taken in connection with the other legends regarding the rhinoceros, which all seem to spring from indigenous Taoist lore. The text of Ko Hung, as quoted in *P‘ei wên yün fu* and translated by Hirth and Chavannes, is fuller than cited above in the *Pên ts‘ao*, while the final clause in regard to placing the horn on the roof does not occur in Ko Hung. The latter links the *hiai ki si* with the *t‘ung t‘ien*, which Hirth and Chavannes translate "communicating with Heaven." This is certainly all right; but I prefer to avoid this term, because it may give rise to misunderstandings, as we are wont to think of Heaven as the great cosmic deity. A comparative study of all passages concerned renders it clear that the rhinoceros is not associated with spiritual, but with material heaven; that is, the sky. It is the stars of the sky which are supposed to be reflected in the veins of the horn. This means that the designs of the horn gave the impetus to the conception of connecting the rhinoceros with the phenomena of the sky,— again a thoroughly Taoistic idea, in which no trace of an outside influence can be discovered. Father ZOTTOLI (Cursus litteraturae sinicae, new ed., Vol. I, p. 301) renders the term *t‘ung t‘ien si tai* by "penetrantis coelum rhinocerotis cingulum." — Chao Ju-kua (HIRTH's and ROCKHILL's translation, p. 103) attributes *hiai ki si* or *t‘ung t‘ien si* also to Baghdad (but I see no reason why these words should denote there a precious stone, instead of rhinoceros-horn). On p. 108 (note 10) the two authors represent the matter as though this reference might occur in *Ling-wai tai ta*, but in fact it is not there (Ch. 3, p. 1 b); it must therefore be due to Chao Ju-kua, who seems to indulge in a literary reminiscence taken from *Hou Han shu*. The passage, accordingly, affords no evidence for a trade in rhinoceros-horns from Baghdad to China, which *per se* is not very likely.—In the illustrations to the *Fêng shên yen i* (ed. of *Tsi ch‘êng t‘u shu*, p. 9, Shanghai, 1908), T‘ung t‘ien kiao chu (see W. GRUBE, Die Metamorphosen der Götter, p. 652) is seated astride a rhinoceros (outlined as a bull with a single striped horn), apparently because his name *T‘ung t‘ien* has been identified with *t‘ung t‘ien si*.

[2] There are several additions to this text as edited in the *Chêng lei pên ts‘ao*, the most interesting of which is that "only the living horns are excellent." This means the horn of a live animal slain in the chase, which was believed to be superior in quality to a horn cast off and accidentally found (compare HIRTH and ROCKHILL, Chau Ju-kua, p. 233). Similar beliefs prevailed in regard to ivory. That coming from the tusk of an elephant killed by means of a pike was considered the best; next in quality

Li Shi-chên does not refer to Ko Hung, the famous Taoist adept of the fourth century,[1] who is the first author to impart a fantastic account in regard to rhinoceros-horn. He is likewise the first to set forth its quality of detecting poison. His text is here translated, as given in *T'u shu tsi ch'êng*.[2]

"Mr. Chêng[3] once obtained a genuine rhinoceros-horn of the kind 'communicating with the sky,' three inches long, the upper portion being carved into the form of a fish. When a man carries such a piece in his mouth and descends into the water, the water will give way for him and leave a vacant space three feet square, so that he has a chance to breathe in the water.[4] The horn 'communicating with the sky' has a single red vein like a silk string running from the base to the tip. When a horn filled with rice is placed among a flock of chickens, the chickens want to peck the grains. Scarcely have they approached the horn to within an inch when they are taken aback and withdraw. Hence the people of the south designate the horn 'communicating with the sky' by the name 'fowl-frightening horn.' When such a horn is placed on a heap of grain, the birds do not dare assemble there. Enveloped by a thick fog or exposed to the night dew, when placed in a courtyard, the horn does not contract humidity. The rhinoceros (*si*) is a wild animal living in the deep mountain-forests. During dark nights its horn emits a brilliant light like torch-fire. The horn is a safe guide to tell the presence of poison: when poisonous medicines of liquid form are stirred with a horn, a white foam will bubble up, and no other test is necessary; when non-poisonous substances are stirred with it, no foam will rise. In this manner the presence of poison can be ascertained. When on a journey in foreign countries, or in places where contagion from *ku*

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was the ivory of an animal which was found shortly after it had died a natural death; least esteemed was that discovered in mountains many years after the animal's death (PELLIOT, *Bulletin de l'Ecole française d'Extrême-Orient*, Vol. II, 1902, p. 166). In Siam, the rhinoceros is still killed with bamboo pikes hardened in the fire and thrust into its jaws and down the throat, as described by Bishop PALLEGOIX (Description du royaume Thai ou Siam, Vol. I, p. 75, Paris, 1854).

[1] He died in 330 A.D. at the age of eighty-one; see GILES (Biographical Dictionary, p. 372); MAYERS (Chinese Reader's Manual, p. 86); BRETSCHNEIDER (Bot. Sin., pt. 1, p. 42); and PELLIOT (*Journal asiatique*, 1912, Juillet-Août, p. 145).

[2] Chapter on Rhinoceros (*hui k'ao*, p. 3), introduced by the author's literary name Pao-p'u-tse, and the title of his work *Têng shê p'ien*, which is not included in the Taoist Canon.

[3] Presumably Chêng Se-yüan, a relative and spiritual predecessor of Ko Hung (L. WIEGER, Taoisme, Vol. I, Le canon, p. 16; PELLIOT, *l. c.*, p. 146).

[4] It is interesting to note that this belief is still upheld in the modern folk-lore of Annam: "Celui qui peut se procurer une corne de rhinocéros et la sculpte en forme de poisson, s'il la met entre ses dents, peut descendre sans danger, comme le rhinocéros ou le poisson, tout au fond de l'eau" (P. GIRAN, Magie et Religion Annamites, p. 104, Paris, 1912).

poison[1] threatens, a man takes his meals in other people's houses, he first ought to stir his food with a rhinoceros-horn. When a man hit by a poisonous arrow is on the verge of dying, and his wound is slightly touched with a rhinoceros-horn, foam will come forth from his wound, and he will feel relief.[2] This property of the horn 'communicating with the sky' of neutralizing poison is accounted for by the fact that the animal, while alive, particularly feeds on poisonous plants and trees provided with thorns and brambles,[3] while it shuns all soft and smooth vegetal matter. Annually one shedding of its horn takes place in the mountains, and people find horns scattered about among the rocks;[4] in this case, however, they must deposit there, in the place of the real one, another horn carved from wood, identical with that one in color, veins, and shape. Then the rhinoceros remains unaware of the theft. In the following year it moves to another place to shed its horn.[5] Other kinds of rhinoceros-horn also are capable of neutralizing poison, without having, however, the wonderful power of the *t'ung-t'ien* variety."

Su Kung, the editor of the *T'ang sin pên ts'ao* (the revised edition of the materia medica of the T'ang dynasty) states as follows: "The *tse* (No. 12,325) is the female rhinoceros. The patterns on its horn are smooth, spotted, white, and clearly differentiated. It is ordinarily called the 'spotted rhinoceros' (*pan si*). It is highly esteemed in prescriptions, but is not such an efficient remedy as the horn of the male rhinoceros."[1]

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[1] See *T'oung Pao*, 1913, p. 322.

[2] The belief that the horn will check the effects of poisoned arrows is repeated in the *Pei hu lu*, written by Tuan Kung-lu around 875 in the T'ang period (PELLIOT, *Bulletin de l'Ecole française*, Vol. IX, 1909, p. 223). The notes of this book regarding the horn are all based on the text of Ko Hung; instead of *t'ung t'ien si*, the term *t'ung si* is employed.

[3] The animal feeds, indeed, on herbage, shrubs, and leaves of trees.

[4] The supposition of the rhinoceros shedding its horn regularly has not been ascertained by our zoölogists; but it is not very probable that it does so, nor have the Chinese made the actual observation. It is clear that their conclusion is merely based on the circumstantial evidence of detached horns occasionally found and picked up in the wilderness, which suggested to them the notion of a natural process similar to the shedding of cervine antlers.

[5] A similar story is told in regard to the elephant by Chên Kūan, who wrote two treatises on the medical virtues of drugs, and who died in the first part of the seventh century (BRETSCHNEIDER, Bot. Sin., pt. 1, p. 44): "The elephant, whenever it sheds its tusks, itself buries them. The people of K'un-lun make wooden tusks, stealthily exchange them, and take the real ones away." K'un-lun is the Chinese designation for the Malayan tribes of Malacca, and was extended to Negrito, Papua, and the negroes of Africa (see HIRTH and ROCKHILL, Chau Ju-kua, p. 32). In this connection we should remember also the words of PLINY (*Nat. hist.*, VIII, 3, § 7), that the elephants, when their tusks have fallen out either accidentally or from old age, bury them in the ground (quam ob rem deciduos casu aliquo vel senecta defodiunt). It is not impossible that the great quantity of fossil ivory mentioned as early as by THEOPHRAST (*De lapidibus* 37, Opera ed. F. WIMMER, p. 345; compare the interesting notes of L. DE LAUNAY, Minéralogie des anciens, Vol. I, pp. 387–390, Bruxelles, 1803) may have given rise to this notion.

Ch'ên Ts'ang-k'i, who lived in the first half of the eighth century, states in his work *Pên ts'ao shi i* ("Omissions in Previous Works on Materia Medica") as follows: "There are not two kinds of the rhinoceros, called the land and water animal. This distinction merely refers to finer and coarser qualities of horns.[2] As to the rhinoceros 'communicating with the sky,' the horn on its skull elongates into a point after a thousand years. It is then adorned, from one end to the other, with white stars, and can exhale a vapor penetrating the sky; in this manner it can communicate with the spirits,[3] break the water, and frighten fowl. Hence the epithet 'communicating with the sky' is bestowed on it. Pao-p'u-tse[4] says, 'When such a rhinoceros-horn is carved into the shape of a fish, and one holding this in his mouth descends into water, a passage three feet wide will open in the water.'"[5]

Su Sung, author of the *T'u king pên ts'ao*, published by imperial order in the age of the Sung dynasty, has the following: "Of rhinoceros-horn, that coming from the regions of the Southern Sea (*Nan hai*) takes the first place; that from K'ien and Shu[6] ranks next. The rhinoceros resembles the water-buffalo, has the head of a pig, a big paunch, short legs, the feet being similar to those of the elephant and having three toes. It is black in color, and has prickles on its tongue. It is fond of eating thorny brambles.[7] Three hairs grow from each pore in its skin, as in swine. There are one-horned, two-horned, and three-horned ones." [1]

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[1] Li Shi-chên's text exactly agrees with that given in the *Chêng lei pên ts'ao*. It is an interesting coincidence that the horn of the female rhinoceros (*tse si kio*) is mentioned in the Annals of the T'ang Dynasty (*T'ang shu*, Ch. 40, p. 6 b) as the tribute sent from the district of Si-p'ing in Shen chou, the present territory of Si-ning in Kan-su. The Annals therefore confirm the statement of the contemporaneous *Pên ts'ao*.

[2] It will be seen below that Li Shi-chên does not share this opinion.

[3] The same paragraph is found in Li Shi, the author of the *Sü po wu chi* (Ch. 10, p. 8 b; ed. of *Pai hai*), ascribed by tradition to the T'ang period, but in fact coming down from the Sung. He interprets the expression *t'ung t'ien* by the words, "It is capable of communicating with the spirits" (*nêng t'ung shên*). According to him, "the horn communicating with the sky" is a thousand years old, long and pointed, overstrewn with white stars, the tip emitting a vapor.

[4] Surname of Ko Hung, a famous Taoist writer, who died at the age of eighty-one about 330 A.D. (see p. 138).

[5] The text in the *Chêng lei pên ts'ao* is somewhat fuller. It opens by saying that the flesh of the rhinoceros cures all poisons, especially poisoning caused by the bites of snakes and mammals. On Java bits of the horn are considered as an infallible antidote against snake-bites (P. J. VETH, Java, Vol. III, p. 289). At the close of Ch'ên Ts'ang-k'i's text it is added that the horn is called also *nu kio* (literally, "slave horn") and *shi kio* ("the horn, with which the animal feeds"); the word *nu* seems to be the transcription of a word from a non-Chinese language.

[6] Ancient designations for the present territory of the provinces of Kuei-chou and Sze-ch'uan.

[7] The entire definition, except the "prickles on the tongue," is derived from Kuo P'o (see p. 93). MARCO POLO (ed. of YULE and CORDIER, Vol. II, p. 285), speaking of

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the rhinoceros on Java, says, "They do no mischief, however, with the horn, but with the tongue alone; for this is covered all over with long and strong prickles [and when savage with any one they crush him under their knees and then rasp him with their tongue]." **Yule** comments that the belief in the formidable nature of the tongue of the rhinoceros is very old and widespread, though he can find no foundation for it other than the rough appearance of the organ. Dr. **Parsons** (p. 9 in the pamphlet quoted above, p. 83) observes, "As to the tongue of the rhinoceros, the scribes assure us that it is so rugged that it can lick off with it the flesh from the bones of a man, but the tongue of the live animal examined by me is as soft and mild as that of a calf; whether it will grow rougher with the advancing age of the animal, I am unable to say." It is easy to see how the fable of the prickly tongue arose. The animal mainly feeds on herbage, and the alleged or real observation of its inclination for brambles led to the conclusion that its tongue must be thorn-proof and prickly. A similar belief seems to obtain in Siam: "On dit que ce monstrueux quadrupède fait ses délices des épines de bambou" (Mgr. **Pallegoix**, Description du royaume Thai ou Siam, Vol. I, p. 156, Paris, 1854).

[1] Now follows in the *Pên ts'ao* the quotation from the *Erh ya* translated above (p. 93). The text then following in the *Pên ts'ao* is purported to be a quotation from *Ling piao lu i;* but it is in fact abridged, and intermingled with extracts from *Yu yang tsa tsu.* For this reason I have abandoned at this point the text of the *Pên ts'ao,* and given separately translations of the two documents, as they are published in *T'u shu tsi ch'êng* (Chapter on Rhinoceros, *hui k'ao,* p. 4). In evidence of my statement, the text of the *Pên ts'ao* here follows; the main share in the confusion will probably be due to Su Sung, not to Li Shi-chên. "The *Ling piao lu i* by Liu Sün (of the T'ang period) says, 'The rhinoceros has two horns: the one on the forehead is called *se si,* the other, on the nose, is called *hu mao si.* The male rhinoceros also has two horns both of which are comprised under the name *mao si* ('hairy rhinoceros'). At present people uphold the opinion that it has but a single horn. These two kinds of horn are provided with grain patterns, and their price largely depends upon the finer or coarser qualities of these designs. The most expensive is the horn with floral designs of the rhinoceros 'communicating with the sky.' The animals with such horns dislike their own shadow, and constantly drink muddy water in order to avoid beholding their reflection. High-grade horns bear likenesses of all things. Some attribute the qualities of the *t'ung t'ien* horn to a pathological cause, but the natural reason cannot be ascertained. The term *tao ch'a* means that one half of the lines pass through in the direction downward; the term *ch'êng ch'a* means that one half of the lines pass through in the direction upward; the term *yao ku ch'a* means that the lines are interrupted in the middle, and do not pass through. Such-like are a great many. The *Po-se* designate ivory as *po-ngan,* and rhinoceros-horn as *hei-ngan,*— words difficult to distinguish. The largest rhinoceros-horn is that of the *to-lo-si,* a single horn of which weighs from seven to eight catties. This is identified with the horn on the forehead of the male rhinoceros. It has numerous decorations conveying the impression of scattered beans. If the specks are deep in color, the horn is suitable to be made into plaques for girdle-ornaments; if the specks are scattered here and there, and light in color, the horn can be made only into bowls and dishes. In the opinion of some, the animal called *se* is the female of the *si.* [It resembles the water-buffalo, and is of dark color. Its hide is so hard and thick that it can be worked into armor.] I do not know whether this is the case or not." (There is here a confusion in Li Shi-chên's text. The passage enclosed in brackets does not occur in the text of the *Chêng lei pên ts'ao,* where it runs, "In the opinion of some, the animal called *se* is the female of the *si;* I do not know whether this is the case or not." The rest is evidently interpolated, and is derived from the *Shuo wên* and its commentaries; at all events, it cannot be ascribed to Su Sung.) "Wu Shi-kao, a physician of the T'ang period, tells the following story: 'The people near the sea, intent on capturing a rhinoceros, proceed by erecting on a mountain-path many structures of decayed timber, something like a stable for swine or sheep. As the front legs of the rhinoceros are straight, without joints, it is in the habit of sleeping by leaning against the trunk of a tree. The rotten

The *Ling piao lu i ki*[1] says, "The rhinoceros, in general, resembles an ox in form. Its hoofs and feet are like those of the elephant. It has a double armor and two horns. The one on the forehead is styled *se si*; the other, on the nose, which is comparatively smaller, is termed *hu mao si*.[2] The designs and spots in the anterior horn are small; many have extraordinary patterns. The male rhinoceros likewise has two horns, both of which are designated *mao si* ('hairy rhinoceros'), and are provided with grain patterns.[3] They are capable of being worked into plaques for girdles.[4] Among a large number of rhinoceros-horns there

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timber will suddenly break down, and the animal will topple in front without being able for a long time to rise. Then they attack and kill it.'" The conclusion is translated above in the text.

[1] In the *Pên ts'ao*, and otherwise, usually styled *Ling piao lu i*. According to BRETSCHNEIDER (Bot. Sin., pt. 1, p. 170), it is an account of the natural productions of China by Liu Sün of the T'ang dynasty.

[2] HIRTH and ROCKHILL (Chau Ju-kua, p. 233), briefly alluding to this text, understand the terms *se si* and *hu mao si* as two different varieties of the rhinoceros. This point of view seems to me inadmissible, as Liu Sün distinctly speaks of the two-horned variety only, and then goes on to specify the two horns in the same animal, which differing in size and shape are, from a commercial and industrial standpoint, of different value. The term *Hu mao* ('cap of the Hu'; the Hu in general designate peoples of Central Asia, Turks and Iranians) is a very appropriate designation for the anterior horn of this species, which is a low, flat, roundish knob, and indeed resembles a small skull-cap. In the *Ming kung shi* (Ch. 4, p. 8; new edition in movable types, 1910, in 8 chs.), a most interesting description of the life at the Court of the Ming dynasty (compare HIRTH, *T'oung Pao*, Vol. VI, 1895, p. 440), this cap is explained as coming down from the T'ang dynasty, and as having been used by the heir-apparent of the Ming; it was made from sable and ermine skins, and worn in the winter on hunting-expeditions to keep the ears warm. It is mentioned in *T'ang shu*, Ch. 24, p. 8 (and presumably in other passages).

[3] Li Shi-chên (p. 150) expands this theme. Fang I-chi, who graduated in 1640, in his *Wu li siao shi* (Ch. 8, p. 20 b), states that only the rhinoceros-horn of Siam has grain patterns, while they are absent in the hairy (that is, the double-horned) rhinoceros of Annam, which has flower-like and spotted designs.

[4] In the Treasure-House of Nara in Japan are preserved objects carved from rhinoceros-horn coming down from the T'ang period, as leather belts with horn plaques, drinking-cups, Ju-i, and back-scratchers. The girdles studded with plaques carved from the horn seem to make their appearance in China under the T'ang dynasty; the assertion of BUSHELL (Chinese Art, Vol. I, p. 119) that they were the "official" girdles of the dynasty does not seem to be justified: at least, they are not enumerated in the class of official girdles, but seem to have been restricted to the use of princesses (compare the account of *Tu yang tsa pien*, translated below, p. 152). Interesting texts bearing on rhinoceros-horn girdles are communicated in *T'u shu tsi ch'êng* (Chapter on Girdles, *tai p'ei, ki shi*, p. 9 b). Such girdles were made also in Champa: the Sung Annals (*Sung shi*, Ch. 489, p. 2) relate a tribute sent from there in the period Hien-tê (954–962) of the Hou Chou dynasty; it was local products including rhinoceros-horn girdles with plaques carved in the form of cloud-dragons. A rhinoceros-horn girdle sent from the Court of the Sung to that of the Khitan is mentioned in *Liao shi* (Ch. 10, p. 1). Under the Kin dynasty (1115–1234) the materials employed for official costume were ranked in the order jade, gold, rhinoceros-horn, ivory (*Kin shi*, Ch. 34, § 3, p. 7). The emperor wore a hat-pin of rhinoceros-horn, and a girdle of black horn (*wu si tai*); the imperial saddle was decorated with gold, silver, rhinoceros-horn, and ivory. Officials of the second rank and higher were entitled to a girdle of the *t'ung si* horn; those of the third rank, to a girdle of the *hua si* horn; the rest, to plain rhinoceros-horn girdles (*ibid.*, Ch. 43). They were in vogue also

are few in which the lines pass through from one end to the other. These are pointed, and their designs are large and numerous. Those with small designs are styled *tao ch'a t'ung*.[1] These two kinds are called also 'bottomless jade cups.'[2] If there is not sufficient space for the lines to pass through, and the white and black designs are equally distributed, then the price is considerably increased, and the horn will become the treasure of numberless generations. When I lived at P'an-yü,[3] I made a thorough examination of what is current there concerning rhinoceros-horn. There is, further, the *to-lo-si*, the largest among the rhinoceros-horns, which may reach seven catties in weight.[4] This is the horn on the forehead of the male rhinoceros, which has numerous designs in the interior conveying the impression of scattered beans. If the stripes are deep in color, the horn is capable of being made into girdle-plaques and implements; if the stripes are dispersed and light in color, the horn may be employed to advantage for the making of cups,

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at the Court of the Ming emperors (*Ta Ming hui tien*, Ch. 5, p. 30), and were allowed to alternate with tortoise-shell girdles (*Ming kung shi* by Liu Jo-yü, Ch. 4, p. 3 b, new ed. of 1910). Under the Yüan dynasty a bureau for works in rhinoceros-horn and ivory was established. This was a sort of court-atelier, in which couches, tables, implements, and girdle-ornaments inlaid with these materials were turned out for the use of the imperial household. An official was placed in charge of it in 1263, and he received an assistant in 1268; the force consisted of a hundred and fifty working-men (*Yüan shi*, Ch. 90, p. 5, K'ien-lung edition). According to Qazwini (1203–83), the inhabitants of Sandâbil (Kan-chou in Kan-su Province) were clad in silk and adorned with ivory and rhinoceros-horn (J. Marquart, Osteuropäische und ostasiatische Streifzüge, p. 87, Leipzig, 1903). De Goeje is inclined to think in this connection of rhinoceros-horn set with gold and worn as amulet; but an instance of such a mode of use is not known in China, and it rather seems that it is in this case likewise the question of girdles decorated with plaques of ivory and rhinoceros-horn. The Mohammedan authors were well aware of the fondness of the Chinese for this material and its employment for girdles, and during the middle ages became the most active importers of the horn into China. The Arabic merchant Soleiman writing in 851 relates that the inhabitants of China make from the horn girdles reaching in price to two and three thousand dinars and more, according to the beauty of the figure found in the design of the horn (M. Reinaud, Relation des voyages faits par les Arabes, Vol. I, p. 29). Hafiz el Gharb, who wrote at the end of the eleventh century, observed, "The most highly esteemed ornaments among the Chinese are made from the horn of the rhinoceros, which, when cut, presents to the eye singular and varied figures" (Ch. Schefer, Relations des Musulmans avec les Chinois, p. 10, in *Centenaire de l'Ecole des langues orientales*, Paris, 1895).

[1] *Tao*, "to reverse;" *ch'a*, "to insert;" *t'ung*, "to pass through."

[2] Thus this phrase is explained in Giles's Dictionary, p. 1326 b (tenth entry).

[3] Playfair (2d ed.), No. 4927: one of the two districts forming the city of Kuang-chou (Canton).

[4] Hirth and Rockhill (Chau Ju-kua, p. 233), relying on Gerini, identify the country *To-lo* or *To-ho-lo*, as written in *T'ang shu*, with a country situated on the Gulf of Martaban. The journey from Kuang-chou to that country takes five months. An embassy with tribute came from there to China in the period Chêng-kuan (627–650), and emphasis is laid on the great number of fine rhinoceroses. See also Schlegel (*T'oung Pao*, Vol. IX, 1898, p. 282) and Pelliot (*Bull. de l'Ecole française*, Vol. IV, 1904, p. 360).

dishes, utensils, platters, and the like.[1] Then there is the horn 'frightening fowl' with a white, silk-like thread; placed in the rice, it scares the fowl away. The 'dust-dispelling horn' is utilized to make hairpins and combs for women; it keeps dust out of the hair. As to the 'water-dispelling horn,' when brought into the water of a river or the sea, it has the power of breaking a way across it. Exposed to a fog, and in the evening, it does not contract moisture. As to the 'resplendent horn,' this one, when put in a dark house, emits its own light.[2] Of all these various horns, I know only from hearsay, for I have not been able to procure and see them."

The *Yu yang tsa tsu* by Tuan Ch'êng-shi of the ninth century[3] makes the following comments on the rhinoceros: "The variety of rhinoceros styled 'communicating with the sky' dislikes its own shadow, and is in the habit of drinking muddy water.[4] When the animal is immersed in the water, men avail themselves of this opportunity to capture it, as it is impossible for it to pull its feet out of the mud. The natural structure of the horn is such that it is filled with figures resembling objects of nature. It is asserted by others that the designs penetrating the rhinoceros-horn are pathological.[5] There are three varieties of design, styled *tao ch'a* ('lines inverted and inserted'), *chêng ch'a* ('straight and inserted'), and *yao ku ch'a* ('inserted like a barrel-shaped drum').[6] They are styled 'inverted,' if one half of the lines pass through in the direction downward. They are styled 'straight,' if one half of the lines pass through in the direction upward. They are styled 'drum-shaped,' if the lines are interrupted in the middle, without passing through. The *Po-se* designate ivory as *po-ngan*, and rhinoceros-horn as *hei-ngan*.[1] Wu Shi-kao, a physician from Ch'êng shi mên,

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[1] The colors indicated by the Chinese writers altogether answer the facts. In its exterior, the color of rhinoceros-horn is usually black or dark brown. A cross-section reveals various colors. A specimen kindly presented to the Museum by Mr. F. W Kaldenberg of New York exhibits in the interior a large black zone running through the centre and extending from the base to the tip, and filling the entire space of the extremity. In the lower, broad portion it is surrounded on the one side by a gold-brown section, about 3.5 cm wide and 21 cm long, and on the other side by a mottled light-yellow and greenish zone almost soap-like in appearance. This horn was found in the woods, and is in places eaten through by insects. The surface of the base exhibits the tips of the bristles, and appears like a coarse brush. The fibres running longitudinally, owing to the effect of weathering, can be easily detached.

[2] As shown above (p. 138), optic properties are attributed to the horn as early as the time of Ko Hung. The subject is discussed in detail below (p. 151).

[3] As now established by P. PELLIOT (*T'oung Pao*, 1912, pp. 373–375), this work was published about 860.

[4] The *Pên ts'ao* adds, "In order to avoid beholding its reflection." This notion is doubtless derived from the animal's predilection for a mud-bath; its favorite haunts are generally in the neighborhood of swamps (LYDEKKER, *l. c.*, p. 31).

[5] The *Pên ts'ao* adds, "But the natural reason cannot be ascertained." This is a comment of Su Sung.

[6] The meaning of these technical terms is not quite easy to grasp. The word *tao* (No. 10,793) is "to invert," *ch'a* (No. 205) means "to insert:" *tao ch'a*, accordingly, may mean "lines inserted in the horn in an inverted position;" and *chêng ch'a*, "lines inserted straight." *Yao* ('loins') *ku* (No. 6421; in *Pên ts'ao* erroneously No. 6227) is the former name for a barrel-shaped drum (*hua ku*, see A. C. MOULE, Chinese Musical Instruments, p. 57, where an example from a verse of Su Tung-p'o is quoted). Yao K'uan, the author of the *Si k'i ts'ung yü*, written about the middle of the twelfth

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century (Wylie, Notes, p. 160), makes the following remark: "The fundamental color of rhinoceros-horn is black. Is the color simultaneously black and yellow, the horn is styled 'standard throughout' (*chêng t'ou*). Is the horn yellow with black borders, it is styled 'inverted throughout' (*tao t'ou*). The horns of standard color are highly esteemed by our contemporaries. If the shape of the horn is round, it is designated as 'horn communicating with the sky' (*t'ung t'ien si*). In the south, there are counterfeits which may be recognized from gradually getting warm when rubbed. In view of the fact that rhinoceros-horn by nature is cold, it does not become warm when rubbed."

[1] Su Sung makes the addition, "words difficult to distinguish." *Po-ngan* means literally "white *ngan*" (No. 57), and *hei-ngan* "black *ngan*,"— evidently transcriptions of *Po-se* words. Palladius, in his Chinese-Russian Dictionary (Vol. I, p. 7), has indicated *po-ngan* ("ivory") and *hei-ngan* ("rhinoceros-horn") as Persian loan-words. Ivory, however, is called in Persian *shirmāhī;* and rhinoceros, as well as the horn of it, *kerkeden*. It is true that *Po-se* is the Chinese name for Persia, which first appears in the *Wei shu;* but Persia is not meant in the above passage. *P'ei wên yün fu* (Ch. 8, p. 89 b) gives three quotations under the heading *hei-ngan si*. One from a book *Sheng shui yen t'an* says that the *Po-se* call rhinoceros-horn *hei-ngan;* the reference to the name of ivory is omitted, so that the clause "it is difficult to discriminate" makes no sense. The second is derived from the *Leng chai ye hua* of the monk Hui-hung, written toward the close of the eleventh century (Wylie, Notes on Chinese Literature, p. 164), and says that "the men of the south (*nan jên*) designate ivory as *po-ngan*, rhinoceros-horn as *hei-ngan*." The third reference is taken from a poem of Tu Fu (712–770), who remarks that *hei-ngan* is a general article of trade of the *Man*. These texts render it probable that the country of *Po-se* here referred to is not Persia, but identical with the Malayan region *Po-se* mentioned by Chou K'ü-fei in his *Ling-wai tai ta*, written in 1178 (Ch. 3, p. 6 b; edition of *Chi pu tsu chai ts'ung shu*), and then after him in the *Chu fan chi*, written in 1225 by Chao Ju-kua (translation of Hirth and Rockhill, p. 125). The two authors seek it in or near the Malay Peninsula, though Negritos are not necessarily to be understood: the mere statement that the inhabitants have a dark complexion and curly hair is not sufficient to warrant this conclusion. Gerini identifies the name Po-se with Lambesi below Atjeh on the west coast of Sumatra, which seems somewhat hypothetical. Mr. C. O. Blagden (*Journal Royal As. Soc.*, 1913, p. 168) is inclined to regard *Po-se* as identical with Pase (or Pasai) in north-eastern Sumatra, but adds that there is no evidence that the place existed as early as 1178. The above text shows that the *Po-se* of the Chinese mediæval writers were a Malayan tribe speaking a Malayan language, for the two transcriptions *po-ngan* and *hei-ngan* can be interpreted through Malayan. In the Hakka dialect, *hei-ngan* is *het-am;* and *hītam* is the Malayan word for "black" (Javanese Ngoko *hireng*). *Pei-ngan* is in the Hakka dialect *p'ak-am* (compare Dictionnaire chinois-français dialecte Hac-ka by Ch. Rey), in Cantonese *pak-om*, in Yang-chou *puk-yā*. In Javanese Krâmâ "white" is *peṭak*, in Javanese Ngoko *putih*, likewise in Batak, in common Malayan *pūteh*. We should expect that the two Malayan words, judging from the Chinese transcriptions, would terminate in the same syllable, which caused misunderstandings on the part of Chinese dealers. There is (or was) perhaps a certain Malayan dialect, in which the word for "white" ended in *-am*, or in which the words for "white" and "black" terminated in *-i* or *-ih* (compare Madagassy *iṇtim*, *iṇti*, "black;" and *puti*, "white;" G. Ferrand, Essai de phonétique comp. du malais et des dialectes malgaches, pp. 24, 54, Paris, 1909). It is evident that neither the Malayan words for "ivory" (*gāding*, Javanese *gaḍing*) and "rhinoceros-horn" (*chula bādak* or simply *chula*), nor the words for "elephant" (*gājah*, Javanese *gajah*) and "rhinoceros" (*badak*, Javanese *warak*), are intended here, but only the color names "white" and "black," with which the traders distinguished ivory and rhi-

while he served in the district of Nan-hai (in Kuang-tung), had occasion to meet there a captain who told him this story: 'The people of my country, intent on capturing a rhinoceros, proceed to erect on a mountain-path many wooden structures like watch-houses or posts for tethering animals.[1] As the front legs of the animal are straight, without joints, it is in the habit of sleeping by leaning against a tree. The rotten timber will suddenly break down, and the animal is unable to rise.[2] Another

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noceros-horn. The Malayan word *badak* seems to cover the entire Malayan area where the rhinoceros is found; it occurs on Borneo in the language of the Dayak (A. Hardeland, Dajacksch-deutsches Wörterbuch, p. 24, Amsterdam, 1859), and on Sumatra (M. Joustra, Karo-Bataksch Woordenboek, p. 59, Leiden, 1907). Among the Malayans, the rhinoceros-horn (*chula*) is supposed to be a powerful aphrodisiac; and there is a belief in a species of "fiery" rhinoceros (*badak api*) which is excessively dangerous when attacked (W. W. Skeat, Malay Magic, p. 150, London, 1900). The horn is carefully preserved, as it is believed to be possessed of medicinal properties, and is highly prized by the Malays, to whom the Semang generally barter it for tobacco and similar commodities (Skeat and Blagden, Pagan Races of the Malay Peninsula, Vol. I, p. 203, London, 1906). There is nothing in these Malayan beliefs showing that complex series of ideas, met with in China. They may be a weak echo of Chinese notions conveyed by Chinese traders bartering among them for the horn.

[1] *Chü yi* (Nos. 2974 and 13,205). I do not know but this may have to be taken as a compound with a more specific technical meaning. The two *Pên ts'ao* have changed this unusual term into "stables for swine or sheep." There is no doubt of what is meant, — posts of rotten timber, which will easily break to pieces under the burden of the animal leaning toward it.

[2] This story has passed also into the Arabic account of the merchant-traveller Soleiman, written in 851 A.D. (M. Reinaud, Relation des voyages faits par les Arabes et les Persans dans l'Inde et à la Chine, Vol. I, p. 29, Paris, 1845): "The *kerkeden* (rhinoceros) has no articulation in the knee, nor in the hand; from the foot up to the armpit it is but one piece of flesh." In *T'oung Pao* (1913, pp. 361–4) the historical importance of this tradition is pointed out by me inasmuch as this originally Indian story has migrated also to the West, where it leaks out in the Greek *Physiologus* (only the rhinoceros is replaced by the elephant), and in Caesar's and Pliny's stories of the elk. I wish to make two additions to these remarks. Aelian (*Nat. an.*, XVI, 20), describing the rhinoceros of India, called by him καρτάζωνος, asserts that its feet have no joints and are grown together like the feet of the elephant (τοὺς μὲν πόδας ἀδιαρθρώτους τε καὶ ἐμφερεῖς ἐλέφαντι συμπεφυκέναι: ed. of F. Jacobs). This passage, therefore, confirms my former conclusion that it was the rhinoceros which was credited in India with jointless legs; but we see that the same notion was likewise attached to the elephant. It may be the case, accordingly, that the elephant with jointless legs was borrowed by the *Physiologus* straight from India. Mr. W. W. Rockhill (Diplomatic Audiences at the Court of China, p. 32, London, 1905) quotes a statement made to him by T. Watters on the kotow question with reference to Lord Macartney's embassy, as follows: "It was an opinion universal, and was told among the Chinese, that the *Kuei-tse* or foreigner was not built up like the *jen* [that is, man] or Chinaman, and particularly that he had no joints in his legs. So that, if the *Kuei-tse* was knocked down or otherwise put on the ground, he could not rise again. It was because the Emperor did not want to have possibly a death or at any rate an unseemly spectacle that he waived the kotow." Compare also Rubruck's story of "the creatures who have in all respects human forms, except that their knees do not bend, so that they get along by some kind of jumping motion" (W. W. Rockhill, The Journey of William of Rubruck, p. 199, London, 1900). The fabulous notion of the jointless legs of the rhinoceros may have arisen from the observation that the animal is indeed in the habit of sleeping in a standing position. Says E. Heller (The White Rhinoceros, p. 41), "The hot hours of the day are spent by the white rhinoceros sleeping in the shade of the scattered clumps of trees or bushes which dot the grassy veldt. They seem to rest indifferently, either lying down or standing

name for the rhinoceros is *nu kio*. There is also the *chên ch'u*, which is presumably a rhinoceros. The rhinoceros has three hairs growing out of each pore.[1] Liu Hiao-Piao asserts that the rhinoceros sheds its horn and buries it, and that people exchange it for a counterfeit horn."

The story alluded to in the latter clause is better worded in the *Pên ts'ao*, which says, "It is told also that the rhinoceros sheds its horn every year, and itself buries it in the mountains. The people near the sea, with all secrecy, make wooden horns, and exchange these for the real ones, and so they go ahead continually. If they would go to work openly, the animal would conceal its horns in another place and defy any search." [2]

Li Sün, who wrote an account of the drugs of southern countries (*Hai yao pên ts'ao*) in the second half of the eighth century, expresses himself in these words: "The rhinoceros 'communicating with the sky,' during the time of pregnancy, beholds the forms of things [3] passing across the sky, and these are reproduced in the horn of the embryo: hence the designation 'communicating with the sky.' [4] When the horn, placed in a water-basin during a moonlight night, reflects the brilliancy of the moon, it is manifest that it is a genuine horn 'communicating with the sky.' The *Wu k'i ki*[5] says, 'The mountain-rhinoceros lives on bamboo and trees. Its urinating is not completed in the course of a day. The I Liao[6] get hold of it by means of bow and arrow. This is

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up with lowered head. When at rest they stand with their noses almost touching the ground, their heads being elevated to a horizontal position only when alarmed."

[1] The same is said in the *Pên ts'ao* in regard to the seal (compare G. SCHLEGEL, *T'oung Pao*, Vol. III, 1892, p. 508). Compare p. 140.

[2] In the text of the *Chêng lei pên ts'ao*, Su Sung terminates, "I do not know whether at present they take horns in this manner or not." Compare the account of Ko Hung, p. 139.

[3] The *Chêng lei pên ts'ao* reads "the destiny of things" (*wu ming*) instead of "forms of things" (*wu hing*).

[4] In the notes embodied in the *Pên ts'ao* regarding the elephant (Ch. 51 A, p. 4) it is said that the patterns in the horn are formed while the rhinoceros gazes at the moon, and that the designs spring forth in the tusks of the elephant while the animal hears the thunder. A work *Wu têng hui yüan*, as quoted in *P'ei wên yün fu* (Ch. 21, p. 113 b), similarly says that the rhinoceros, while enjoying the moonlight, produces the designs in its horn, and that the floral decorations enter the tusks of the elephant when it has been frightened by thunder. These passages prove that it is material heaven to whose influence the formation of the natural veins in horn and tusk is ascribed. The rhinoceros gazing at the moon is represented in *T'u shu tsi ch'êng* (Fig. 10).

[5] A work listed in the *T'ai p'ing yü lan* as being published in 983; but, as it is quoted here by Li Sün, it must have existed in or before the eighth century.

[6] An aboriginal tribe belonging to the stock of the *Man*, according to *T'ang shu* (Ch. 43 A, p. 6 b) settled in Ku chou (PLAYFAIR, No. 3256) in the province of Kuei-chou. Compare p. 82 in regard to the possibility of killing a rhinoceros with arrows.

the so-called rhinoceros of K'ien.'[1] The *I wu chi*[2] says, 'In the sea-water of Shan-tung there is a bull that delights in the sounds of string and wind instruments. When the people make music, this bull leaves the water to listen to it, and at that moment they capture it.'[3] The rhinoceros has a horn on its nose, and another on the crown of its head. The nose-horn is the one best esteemed. The natural histories (*pên ts'ao*) are acquainted only with the mountain-rhinoceros. I have not yet seen the water-rhinoceros."[4]

K'ou Tsung-shi, a celebrated physician of the Sung period, reports in his *Pên ts'ao yen i* (completed in 1116)[5] thus: "The designs in the horns of the river-rhinoceros and the southern rhinoceros are fine. The black rhinoceros-horn has designs clearly displayed, while the yellow rhinoceros-horn has very sparse designs. None equals the patterns in the horn of the Tibetan breed, which are high, and come out clearly at both ends.[6] If the forms of objects pictured in the horn are yellow, while the rest is black, the horn is 'standard color throughout' (*chêng t'ou*). If the forms of objects are black, while the rest is yellow, the horn is 'inverted throughout' (*tao t'ou*). If the black color is taken as standard, and the forms of the design are imitative of real objects, the horn is a treasure; this horn is styled *t'ung si* ('penetrating rhinoceros'). It is an indispensable condition that the patterns come out clearly, and that the yellow and black be sharply differentiated. If both ends are moist and smooth, the horn is of the first quality."[7]

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[1] The territory of the province of Kuei-chou, where the rhinoceros formerly occurred, as already attested by Su Sung (above, p. 140).

[2] Several works of this title were in existence (see Bretschneider, Bot. Sin., pt. 1, p. 154).

[3] The animal in question is certainly not a rhinoceros, and has crept in here by way of wrong analogy. In his notes on cattle, Li Shi-chên mentions a variety "marine ox" (*hai niu*, Ch. 51 A, p. 7 a). This creature is described after the *Ts'i ti ki* by Fu Ch'ên of the fifth century or earlier (Bretschneider, Bot. Sin., pt. 1, p. 201) as follows: "Its habitat is around the islands in the sea near Têng-chou fu (in Shantung); in shape it resembles an ox, it has the feet of an alligator (*t'o* No. 11,397, not *iguana*, as Giles still translates, despite the correction of E. v. Zach, *China Review*, Vol. XXIV, 1900, p. 197), and the hair of a bull-head fish. Its skin is soft, and can be turned to manifold purposes; its blubber is good to burn in lamps." The marine ox, accordingly, must be an aquatic mammal of the suborder of Pinnipedia (seals). There may be a grain of truth in the above story: the intelligence of seals is remarkable, they are easily tamed and susceptible to music. There is an interesting chapter on tamed seals in the classical treatise of K. E. v. Baer, Anatomische und zoologische Untersuchungen über das Wallross (*Mémoires de l'Acad. imp. des sciences de St. Pétersbourg*, 6th series, Vol. IV, 1838, pp. 150–159).

[4] The last clause is not in the text of *Chêng lei pên ts'ao.*

[5] Pelliot (*Bulletin de l'Ecole française d'Extrême-Orient*, Vol. IX, 1909, p. 217).

[6] The rhinoceros of Tibet has been discussed above, p. 116.

[7] The Arabic authors assert that the interior of the Indian rhinoceros-horn frequently presents designs of a human figure, a peacock, or fish, and that the price paid in China is raised according to the beauty of these designs (M. Reinaud, Relation

Li Shi-chên himself, the author of the *Pên ts'ao kang mu*, sums up as follows: "The habitat of the rhinoceros is in the regions of the *Si Fan*,[1] the southern Tibetan tribes (*Nan Fan*), the southern portions of Yün-nan, and in Kiao-chou, and occurs there everywhere. There are three species,— the mountain-rhinoceros, the water-rhinoceros, and the *se si*. There is, further, a hairy rhinoceros resembling the mountain-rhinoceros, and living in hilly forests; great numbers of it are captured by men. The water-rhinoceros makes its permanent abode in water, and is therefore very difficult to capture. It has, in all, two horns. The horn on its nose is long, that on its forehead is short. The skin of the water-rhinoceros has a pearl-like armor,[2] but not so the mountain-rhinoceros.

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des voyages faits par les Arabes, Vol. I, p. 29). **REINAUD** (Vol. II, pp. 68, 69) comments on this point that the Chinese are satisfied to compare the designs with flowers and millet-seeds, and do not discover in them half of the things which the Arabs saw in them. It seems to me that the Arabs, in this case, merely reproduce the ideas of the Chinese. The philosophy of these designs was fully developed in the T'ang period. K'ou Tsung-shi speaks of real objects visible in the horn; and Wang P'i-chi, in his *Shêng shui yen t'an lu* (p. 135), offers an elaborate contribution to this question. According to him, "the designs in the horn from Kiao-chi are like hemp-seeds, the horn being dry, a bit warm, and glossy; the horn imported on ships and coming from the Arabs has patterns like *chu yü* flowers [this name applies to three different plants: **BRETSCHNEIDER**, Bot. Sin., pt. 2, No. 498], is glossy and brilliant with colors, some resembling dog-noses, as if they were glossed with fat; others with floral designs and strange objects, these horns being styled *t'ung t'ien si;* some like sun and stars, others like clouds and moon; some like the corolla of a flower, some like scenery; some have birds and mammals, others dragons and fishes; some have deities, others palaces; and there are even costume and cap, eyes and eyebrows, staff and footgear [conveying the illusion of the picture of a wanderer], beasts, birds, and fishes. When the horn is completed into a carving, as if it were a veritable picture, it is highly esteemed by the people. The prices are fluctuating, and it is unknown how they are conditioned." There is assuredly an inward relation between the statements of this account and the Arabic texts of Damīrī quoted by **REINAUD** (Vol. II, p. 69). It is hardly necessary to insist on the chronological point that Damīrī (1344–1405) wrote his zoölogical dictionary *Hayāt el-haiwān* (C. **HUART**, Littérature arabe, p. 365, Paris, 1902) several centuries after Wang P'i-chi (end of eleventh century). From a psychological point of view, the dependence of the Arabs in this matter on the philosophy of the Chinese is self-evident. Neither the classical world nor ancient India has developed any similar thoughts; and this subject is decidedly Chinese, with a strong Taoist flavor of nature sentiment. It must not be overlooked, either, that al-Bērūnī (**SACHAU**, Alberuni's India, Vol. I, p. 204) merely states that "the shaft of the horn is black inside, and white everywhere else," and that he is entirely reticent about figures in the horn. The Arabs interested in the trade of the horn to China imbibed this lesson, and propagated it themselves in catering to the taste of their customers. The question is whether, in the interest of the business, they did not help nature by art, and may have produced several of the more fanciful designs artificially. This, however, is no matter of great concern; and the fact remains that bristly fibres of various tinges compose the horn, and result in a natural play of design and color which is apt to arouse the imaginative power of a susceptible mind.

[1] Western Tibetan tribes; from our standpoint, eastern Tibetans.

[2] I take this to be identical with what our zoölogists say in regard to the skin of the Asiatic species, which "has the appearance of a rigid armor studded with tubercles." The whole skin of the Javan species, as already remarked by B. **CUVIER** (The Animal Kingdom, Vol. I, p. 157, London, 1834), is covered with small compact angular tubercles. **JOANNES RAIUS** (Synopsis methodica animalium quadrupedum, p. 122, Londini, 1693) describes the skin of the rhinoceros thus: "Auriculae porcinae,

The *se si* is the female of the rhinoceros which is termed also 'sand-rhinoceros.' It has but a single horn on the crown of the head. The natural designs of the horn are smooth, white, and clearly differentiated, but it is useless as medicine, for the patterns on the horn of the male are big, those on the horn of the female too fine. In the beginning of the period Hung-wu (1368–1398) Kiu-chên[1] sent one as tribute, which was called one-horned (*monoceros*) rhinoceros. The view of Ch'ên Ts'ang-k'i that there are not the two kinds of land and water animals, the view of Kuo P'o that the rhinoceros has three horns, and the view of Su Sung that the hairy rhinoceros is the male rhinoceros, are all erroneous. The term 'hairy rhinoceros' is at present applied to the yak.[2] The designs of the rhinoceros-horn are like fish-roe. On account of their shape they are styled 'grain patterns.'[3] Inside of the latter there are eyes, styled 'grain eyes.' If yellow decorations rise from a black background, the horn is 'standard throughout.' If black decorations rise from a yellow background, the horn is 'inverted throughout.' If within the decorations there are again other decorations, the horn is 'double throughout.' The general designation for these is *t'ung si*, and they are of the highest grade. If the decorations are spotted, as it were, with pepper and beans, the horns are middle grade. The horn of the black rhinoceros, which is of a uniform black color and devoid of decorations, is the lowest grade.[4] If the horn of the rhinoceros 'communicating with the sky' emits light, so that it can be seen at night, it is

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molli et tenui cute vestitae; reliquum corpus dura admodum et crassa, velut squamis quibusdam crustaceis rotundis aspera." This is the reason why in some Chinese and early European sketches the animal is covered with scales (see Figs. 3 and 11, and Plate IX).

[1] PLAYFAIR, No. 1295 (1278): in Annam (compare above, p. 81).

[2] Li Shi-chên refers to the notes on this subject contained in the same chapter. This remark renders it plain that it was the notion of "rhinoceros" which was transferred in recent times to the yak, and that the development was not in the reverse order, as assumed by Professor Giles.

[3] This and the following sentences, commenting on the natural designs of the horn, have been translated by S. JULIEN (in M. REINAUD, Relation des voyages faits par les Arabes, Vol. II, p. 68).

[4] In the Memoirs on the Customs of Cambodja by Chou Ta-kuan of the Yüan period, translated by P. PELLIOT (*Bulletin de l'Ecole française d'Extrême-Orient*, Vol. II, 1902, p. 167), it is said that the white and veined rhinoceros-horn is the most esteemed kind, and that the inferior quality is black. The List of Medicines exported from Hankow, published by the Imperial Maritime Customs (p. 15, Shanghai, 1888), is therefore wrong in stating that the black and pointed horns are considered the best. A valuation for the horn is not given there. According to a report of Consul-General G. E. ANDERSON of Hongkong (*Daily Consular and Trade Reports*, 1913, p. 1356), rhinoceros-horns are imported into Hongkong to some extent, the price ranging from $360 to $460 per picul, or from about $1.30 to $1.65 gold per pound; they are largely of African production, and imported from Bombay. According to L. DE REINACH (Le Laos, Paris, no date, p. 271), rhinoceros-horns have in the territory of the Laos a market-value of 111–137 fr. the kilo, and rhinoceros-skins 60–70 fr. a hundred kilo.

called 'horn shining at night' (*ye ming si*):[1] hence it can communicate with the spirits, and open a way through the water. Birds and mammals are frightened at seeing it. The *Shan hai king* speaks of white rhinoceroses.[2]

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[1] This idea may have been borrowed from the precious stones believed to shine at night (Hirth, China and the Roman Orient, pp. 242–244; Chavannes, Les pays d'occident d'après le Heou Han Chou, *T'oung Pao*, 1907, p. 181). Jade disks shining at night (*ye kuang pi*) are mentioned in *Shi ki* (Ch. 87, p. 2 b). The note of Li Shi-chên is doubtless suggested by the following passage of the *Tu yang tsa pien*, written by Su Ngo in the latter part of the ninth century (Wylie, Notes on Chin. Lit., p. 194; ed. of *Pai hai*, Ch. B, p. 9, or *P'ei wên yün fu*, Ch. 8, p. 87 b): "In the first year of the period Pao-li (825 A.D.) of the Emperor King-tsung of the T'ang dynasty, the country of Nan-ch'ang [in Kiang-si; Playfair, No. 4562] offered to the Court a rhinoceros-horn shining at night (*ye ming si*). In shape it was like the 'horn communicating with the sky.' At night it emitted light, so that a space of a hundred paces was illuminated. Manifold silk wrappers laid around it could not hide its luminous power. The Emperor ordered it to be cut into slices, and worked up into a girdle; and whenever he went out on a hunting-expedition, he saved candle-light at night." We even hear of a luminous pillow (*ye ming chên*) lighting an entire room at night (*Yün sien tsa shi*, Ch. 6, p. 3 b, in *T'ang Sung ts'ung shu*, which quotes from *K'ai-yüan T'ien-pao i shi*). The story of *Tu yang tsa pien* may be connected with the curious tradition regarding Wên K'iao (*Tsin shu*, Ch. 67, p. 5), who by the alleged light emitted from a rhinoceros-horn beheld the supernatural monsters in the water (see Pétillon, Allusions littéraires, p. 227; S. Lockhart, A Manual of Chinese Quotations, p. 280; and Giles, Dictionary, p. 794 b,—who translate 'to light a rhinoceros-horn,' which is not possible, as in this case the horn would burn down; the horn was shining through its alleged own light). An illustration of this scene by Ting Yün-p'êng is published in *Ch'êng shi mo yüan* and *Fang shi mo p'u*. The notion that the rhinoceros-horn is luminous at night, and is therefore styled "shining or bright horn" (*ming si*, or *kuang ming si*), and also "shadow horn" (*ying si*), is found in *Tung ming ki* (Wu-ch'ang print, Ch. 2, p. 2), embodied in a fabulous report on a country Fei-lo, said to be nine thousand *li* from Ch'ang-ngan in Indo-China (Ji-nan). This work relating to the time of the Han Emperor Wu, though purported to have been written by Kuo Hien of the Han, is one of the many spurious productions of the Leu-ch'ao period (fourth or fifth century), and teeming with anachronisms and gross inventions; some accounts in it are interesting, but devoid of historical value (see Wylie, Notes, p. 191). The assertion there made, that the inhabitants of Fei-lo drive in carriages drawn by rhinoceros and elephant, is very suspicious; but the report that the horns sent from there were plaited into a mat, the designs of which had the appearance of reticulated silk brocade, is probably not fictitious; for this is confirmed by a passage of the T'ang Annals (Chapter *wu hing chi*, quoted in *T'u shu tsi ch'êng*), according to which a certain Chang Yi-chi had a mat made for his mother from rhinoceros-horn. Since the latter (the designation "horn," from a scientific standpoint, is a misnomer) is composed of agglutinated hair or bristles, it is possible to dissolve a horn into thread-like fibres; and the possibility of a technique employing these for the plaiting of mats must be admitted.

[2] According to the more precise wording of the passage, as quoted in *P'ei wên yün fu* (Ch. 8, p. 88 a), the white rhinoceros occurs in the mountains of Kin-ku, inhabited by large numbers of other wild animals, also hogs and deer. The *Shan hai king* is an apocryphal work teeming with fables, and has little value for scientific purposes. The *P'ei wên yün fu*, further, quotes the *Tung kuan Han ki* (completed about 170 A.D.; Bretschneider, Bot. Sin., pt. I, No. 990) to the effect that in the first year of the period Yüan-ho (84 A.D.) of the Emperor Chang of the Han dynasty the country Ji-nan (Tonking) offered to the Court a white pheasant and a white rhinoceros. But this text, unreservedly accepted by Hirth (Das weisse Rhinoceros, *T'oung Pao*, Vol. V, 1894, p. 392), must be taken with some caution, as it is identical with, and apparently derived from, the passage in *Hou Han shu* (Ch. 116, p. 3 b), according to which, in the first year of the period Yüan-ho (84 A.D.), the *Man I* beyond the boundary of Ji-nan offered to the Court a live rhinoceros and a white pheasant. The

"The work *K‘ai-yüan i shi*[1] mentions the 'cold-dispelling' rhinoceros-horn (*pi han si*), whose color is golden, and which was sent as tribute by Tonking (*Kiao-chi*).[2] During the winter months it spreads warmth, which imparts a genial feeling to man. The *Po k‘ung leu t‘ie*[3] speaks of the 'heat-dispelling' rhinoceros-horn (*pi shu si*) obtained by the Emperor Wen-tsung (827–840 A.D.) of the T‘ang dynasty.[4] During the summer months it can cool off the hot temperature. The *Ling piao lu i*[5] records the horn of the 'dust-dispelling' rhinoceros (*pi ch‘ên si*), from which hairpins, combs, and girdle-plaques are made, with the effect that dust keeps aloof from the body. The *Tu yang tsa pien*[6]

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text of the official Annals is decisive, and it is easy to see that the word "live" could have been altered into "white" by the suggestion of the white pheasant. The *T‘ang leu tien*, a description of the administrative organization of the period K‘ai-yüan (713–741) of the T‘ang dynasty, ascribed to the Emperor Yüan-tsung (compare Pelliot, *Bulletin de l'École française d'Extrême-Orient*, Vol. III, 1903, p. 668), says that "the white rhinoceros (*pai se*) is an auspicious omen of the first order" (*shang jui;* quoted in *Yen kien lei han*, Ch. 410, p. 17 b). But as most of the creatures appearing in the category of such "auspicious omens" are imaginary, it is more than probable that this white rhinoceros owes its existence to pure fancy. The white rhinoceros, therefore, does not rest on good evidence; and I am not convinced that the Chinese were ever acquainted with such a variety. Moreover, the so-called White or Square-nosed Rhinoceros (*Rhinoceros simus cottoni*) has not yet been traced in Asia, but is restricted to Africa. It is described and illustrated by A. Newton (*Proceedings of the Zoölogical Soc. of London*, Vol. I, 1903, pp. 222–224; see *ibid.*, Vol. II, 1903, p. 194), R. Lydekker (The Game Animals of Africa, p. 38, London, 1908), and E. L. Trouessart (Le Rhinocéros blanc du Soudan, *Proceedings* etc., 1909, pp. 198–200, 3 plates). A fine monograph is devoted to it by E. Heller, The White Rhinoceros (*Smithsonian Misc. Collections*, Vol. 61, No. 1, Washington, 1913, 31 plates), embodying the results of Colonel Roosevelt's African expedition. As to the "white" color, Mr. Heller observes, "The skins cannot under the most lenient circumstances be classed as white. They are, however, distinctly lighter than those of the black species, and may on this account be allowed to retain their popular designation of white. Their true color is smoke gray of Ridgway, a color conspicuously lighter than the dark clove-brown of their geographical ally, *Diceros bicornis*."

[1] Matters omitted in the Annals of the Reign of *K‘ai-yüan* (713–742) by Wang Jên-yû, written during the Wu-tai period (907–960); see Bretschneider, Bot. Sin., pt. 1, p. 156.

[2] The text is quoted in *P‘ei wên yün fu* (Ch. 8, p. 87 b) as follows: "The country of Tonking sent a rhinoceros-horn of golden color, which was placed in a golden pan in a hall of the palace; the warmth caused by it was felt by every one; the envoy said that it was the cold-dispelling rhinoceros-horn."

[3] The complete title runs *T‘ang Sung Po k‘ung leu t‘ie;* it is a cyclopædia in 100 chapters arranged according to subject-matters dealing with affairs of the T‘ang and Sung periods (Ming edition in John Crerar Library, No. 786, in 96 vols.).

[4] The exact text is given in *P‘ei wên yün fu.* A sceptre of auspicious augury (*Ju i*), made from a "heat-dispelling horn" in the possession of the same emperor, is mentioned in *Tu yang tsa pien* (Ch. B, p. 12; see note 6). Another *Ju i* of ordinary rhinoceros-horn is spoken of in *Yün sien tsa shi* (Ch. 3, p. 5 b; ed. of *T‘ang Sung ts‘ung shu*).

[5] See p. 142.

[6] An account of rare and curious objects brought to China from foreign countries from 763 to 872, by Su Ngo in the latter part of the ninth century (Bretschneider, *l. c.*, p. 204; Wylie, Notes on Chin. Lit., p. 194). According to the passage in the original text (ed. of *Pai hai*, Ch. C, p. 9 b), this girdle was in the possession of the

refers to the 'wrath-removing' rhinoceros-horn (*küan*, No. 3141, *fên si*), from which girdles are made, causing men to abandon their anger; these are scarce and veritable treasures."

These extracts, ranging from the fifth to the sixteenth century, leave no doubt that during this interval the two words *se* and *si* invariably referred to the rhinoceros, that the two species of the single-horned and two-horned animal were recognized, that their geographical distribution was perfectly and correctly known,[1] and that the main characteristics of the animal were seized upon. Among these, the horn naturally attracted widest attention, and in most cases was the only part of the animal that came within the experience of the writers. The wondrous lore surrounding the horn, the supernatural qualities attributed to it, led also to fabulous stories regarding the animal itself, which in the midst of impenetrable forests was seldom exposed to the eye of an observer. A lengthy dissertation on the healing properties of the horn, and on its utilization in prescriptions, is added in the *Pên ts'ao kang mu*; but this matter has no direct relation to our subject.[2]

Princess T'ung-ch'ang, and consisted of small balls turned from horn, as shown by the description that they were round like the clay pellets used in shooting with the bow *tan* (No. 10,603). These bows, a combination of a sling with a bow, are still turned out in Peking, and used in slaying birds, to prevent the plumage from being damaged. In India they are known as *goolail* (YULE and BURNELL, Hobson-Jobson, p. 386), and are chiefly employed for exterminating crows, being capable of inflicting severe injuries. Every ethnologist is familiar with these sling-bows or pellet-bows, as they are called, and with the difficult problem presented by their geographical distribution over India, south-eastern Asia, and in the valley of the Amazon in South America (compare G. ANTZE, in *Jahrbuch des Museums für Völkerkunde zu Leipzig*, Vol. III, 1908, pp. 79–95; and W. HOUGH, *Am. Anthr.*, 1912, p. 42). It is further added in the *Tu yang*, that this horn, when placed in the ground, does not rot,—a notion presumably originated by occasional finds of fossil horns or those accidentally shed by the animal.

[1] The case is certainly such that the zoölogist, as in so many other cases, is obliged to learn from the historian in regard to the distribution of animals in former periods of history. Our zoögeographers trace the area of the two-horned rhinoceros to Sumatra, Borneo, Siam, and the Malay Peninsula, and from there extending northward through Burma and Tenasserim to Chittagong and Assam. Our investigation has taught us that it covered in ancient times a much wider geographical zone, including Cambodja, Annam, and southern China, in particular Kuei-chou, Hu-nan, Yün-nan, and Sze-ch'uan.

[2] The theory of Ko Hung or Pao-p'u-tse of the fourth century, as shown above (p. 139), is that the horn can neutralize poison, because the animal devours all sorts of vegetable poisons with its food. Li Shi-chên states that the horn is non-poisonous, and is forestalled in this opinion by T'ang Shên-wei. Shavings of the horn, the decoction of which is taken in fever, small-pox, ophthalmia, etc., are still to be had in all Chinese drug-stores. A specimen obtained by me at Hankow was said to come from Tibet. According to S. W. WILLIAMS (The Chinese Commercial Guide, p. 95, Hongkong, 1863), a decoction of the horn shavings is given to women just before parturition and also to frightened children. As stated by the same author, the skin of the animal is likewise employed in medicine. It is made into a jelly which is highly esteemed, and the same is done with the feet (SOUBEIRAN and THIERSANT, La matière médicale chez les Chinois, p. 47, Paris, 1874). This practice presumably originated in Siam. Monseigneur PALLEGOIX (Description du royaume Thai ou

The word *se* is presumably the older of the two, as the ancient Chinese seem to have been first acquainted with this species, while it was still alive in their country; at a somewhat later time, which, however, still ranged in a prehistoric period, they became familiar with the two-horned *si*. This theory would account for the statement of Li Shi-chên that the ancients were fond of saying *se*, while later on people inclined toward the word *si;* and that in the north (the ancient habitat of the *se*) the word *se* prevailed, in the south the word *si*. This came about

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Siam, Vol. I, p. 156) reports the following: "On attribue beaucoup de vertus à sa corne, et (chose singulière!) sa peau, quelque épaisse et coriace qu' elle soit, est regardée comme un mets délicat et fortifiant pour les personnes faibles. On grille d'abord la peau, on la ratisse, on la coupe en morceaux et on la fait bouillir avec des épices assez longtemps pour la convertir en matière gélatineuse et transparente. J'en ai mangé plusieurs fois avec plaisir, et je pense qu'on pourrait appliquer avec succès le même procédé aux peaux de quelques autres animaux." The skin, as well as the horn, the blood, and the teeth, were medicinally employed in Cambodja, notably against heart-diseases (A. CABATON, Brève et véridique relation des événements du Cambodge par Gabriel Quiroga de San Antonio, p. 94, Paris, 1914). In Japan rhinoceros-horn is powdered and used as a specific in fever cases of all kinds (E. W. CLEMENT, Japanese Medical Folk-lore, *Transactions As. Soc. of Japan*, Vol. XXXV, 1907, p. 20). Ko Hung of the fourth century, as we observed, is the very first Chinese author to develop the theory of the horn as to its ability to detect poison, and as an efficient antidote against poison. He also reasons his theory out, and supports it with arguments of natural philosophy breathing a decidedly Taoist spirit. Nothing appears in his account that would necessitate a cogent conclusion as to his dependence on Indian thought. Indian-Buddhist influence on the Taoism of that period certainly is within the reach of possibility, but like everything else, remains to be proved; and for the time being I can only side with PELLIOT (*Journal asiatique*, 1912, Juillet-Août, p. 149) when he remarks to L. Wieger, "Ici non plus, je ne nie pas la possibilité de semblable influence, mais j'estime qu'il faut être très prudent." If a Buddhist text translated from Sanskrit into Chinese in or before the age of Ko Hung, and containing a distinct reference to this matter, can be pointed out, I am willing to concede that Ko Hung is indebted to an Indian source; if such evidence should fail to be forthcoming, it will be perfectly sound to adhere to the opinion that Ko Hung's idea is spontaneous, and the expression of general popular lore obtaining at his time; and there is no valid reason why it should not be. No ancient Sanskrit text containing similar or any other notions concerning this subject has as yet come to the fore; and the evidence in favor of Indian priority is restricted to the slender thread of Ctesias' account (p. 97), which is insufficient and inconclusive. The light-minded manner with which BUSHELL (Chinese Art, Vol. I, p. 119) dealt in the matter (as if the lore of the horn and the horn itself had only been a foreign import in China!) must be positively rejected. BRETSCHNEIDER (above, p. 75) no doubt was a saner judge. Neither in ancient India nor in the classical world do we find any trace of such beliefs as those expounded by Ko Hung and his successors, nor a particle of all that Chinese natural philosophy of the horn. AELIAN merely reiterates Ctesias; JUVENAL (VII, 130) mentions an oil-bottle carved from the horn; the *Periplus Maris Erythraei* (ed. FABRICIUS, pp. 40, 44, 56) refers to the export of the horn from African ports only, not from India. The Cyranides (F. DE MÉLY, Les lapidaires grecs, p. 90) are ignorant of the poison-revealing character of the horn. But for Ctesias, we should be compelled to admit that this belief originated in China and spread thence to India. At any rate, the report of Ctesias stands isolated in the ancient world; the untrustworthy character of this author is too well known to be insisted upon, and it would be preposterous to build a far-reaching conclusion on any of his statements which cannot be checked by other sources. His text is handed down in poor condition, and as late as by Photius, patriarch of Byzance (820–891), so that I am rather inclined to regard the incriminated passage as an interpolation of uncertain date. The belief in rhinoceros-horn being an efficient antidote against poison prevailed in Europe until recent times.

naturally, as the south bordered on Indo-China, where the two-horned species abounded, and a lively trade in its horn was carried on at all times. Hence in the primeval period represented by the songs of the *Shi king* the rhinoceros is styled *se*.

The philological students of China will certainly feel somewhat uneasy at the thought that an animal like the rhinoceros should have been within the vision of the early Chinese. We are all wont to look at

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It seems to have received a fresh impetus from India in the sixteenth century. The Portuguese physician Garcia Ab Horto (Aromatum et Simplicium aliquot, p. 66, Antverpiae, 1567; or Due libri dell' historia dei semplici, aromati, et altre cose che vengono portate dall' Indie Orientali pertinenti all' uso della medicina, p. 58, Venetia, 1582) first reports from personal experience that rhinoceros-horn is employed in Bengal as an antipoisonous remedy, and goes on to tell that this is a fact established by experiments; his story is that of two poisoned dogs—the one who had swallowed double the dose was cured after taking in water a powder prepared from the horn, while the other dog, who had been given but a small quantity of poison and did not receive the remedy of the horn, was doomed to death. Doctor Nicolò Monardes, physician in Sevilla (Delle cose che vengono portate dall' Indie occidentali pertinenti all' uso della medicina, p. 72, Venetia, 1582), has the following account: "L' Unicorno vero è cosa di maggiore effetto, che habbiamo veduto, e nella quale si trova maggiore esperienza; del quale poco si scrive. Solo Philostrato nella vita di Apollonio dice, essere contra il veneno; il que ampliarono molto i Moderni. Bisogna, che sia del vero; perche ne sono molti di falsi, e finti. Io vidi in questa città un Vinitiano, che ne portò un pezzo molto grande, e ne dimandava cinquecento scudi; delquale fece in mia presenza la esperienza. Prese un filo, e lo unse molto bene con Elleboro, e lo passò per le creste di due polli; all' uno de'quali diede un poco di Unicorno raso in un poco di acqua comune; e all' altro non diede cosa alcuna. Questo morì tra un quarto di hora; l'altro che prese l'Unicorno durò due giorni, senza voler mangiare, e alla fine di due giorni morì, secco come un legno. Credo io, che se si desse ad huomo, che non morrebbe; perche tiene le vie più aperte da potere scacciare da se il veneno; e gli si può ancho fare de gli altri rimedij, col mezzo de' quali, e coll' Unicorno potrebbe liberarsi. Di tutte queste Medicine compongo io una polvere, che cosi per qualità manifeste, come per proprietadi occulte ha gran virtù, e è di grande efficacia contra tutti i veneni, e contra le febbri Pestilentiali, ò che habbiano mala qualità; ò cagione venenosa." Then he describes the composition of this remedy. This European doctor was a contemporary of Li Shi-chên. Who, after reading the confession of his firm belief in the virtues of rhinoceros-horn, will blame the Chinese physicist? In the court ceremonial of France as late as 1789, instruments of unicorn-horn are said to have been employed for testing the royal food for poison.— Chinese lore of the rhinoceros is based on actual observation and speculation built thereon. Not only, as previously pointed out, are the observations of the Chinese in this line more complete, but even more accurate, than those of the classical peoples. In fact, the Chinese adopted nothing from the latter as to their notions of the animal. It is of especial interest that the fantastic belief of the ancients in the mobility of the horn is entirely absent in China. Pliny (*Nat. hist.*, viii, 21, §73; ed. Mayhoff, Vol. II, p. 103) observes in regard to the animal *eale*, which has been regarded by some authors as the two-horned rhinoceros, "It has movable horns several cubits long, which it can alternately raise in a combat and turn straightforward or obliquely, according to opportunity" (maiora cubitalibus cornua habens mobilia, quae alterna in pugna sistit variatque infesta aut obliqua, utcumque ratio monstravit). The mobility of the horn is insisted on by Cosmas: "When it is wandering about, the horns are mobile; but when it sees anything which excites its rage, it stiffens them, and they become so rigid that they are strong enough to tear up even trees with the roots — those especially which come in the way of the front horn" (McCrindle, Ancient India, p. 156). In a similar manner al-Bērūnī (Sachau, Alberuni's India, Vol. I, p. 204) says about the African rhinoceros that its second and longer horn becomes erect as soon as the animal wants to ram with it.

things in the dim candle-light of school traditions, and to think of the rhinoceros as an exclusively southern, tropical animal; but the fact remains that it is not, any more than the tiger, whose original home doubtless was on the Amur, and who is a comparatively recent intruder into Bengal. Climatic conditions and natural surroundings were different in ancient China from what they are at present; and the hills were still crowned by dense forests which were haunted by colossal pachyderms, like the elephant, the tapir, and the rhinoceros.[1]

The historical fact that the rhinoceros was a living contemporary of the ancient Chinese is fully confirmed by the investigations and results of palæontology. As early as 1871, F. PORTER SMITH[2] stated, "The teeth of the extinct rhinoceros of China, met with in the caves of Sze-ch'uan, are sold as dragon's teeth." Specimens of teeth in the possession of the naturalist D. Hanbury, obtained in Shen-si or Shan-si, were examined by Waterhouse of the British Museum, and referred to *Rhinoceros tichorhinus* Cuv., *Mastodon*, *Elephas*, *Equus*, and two *Hippotheria.*[3]

Armand David discovered at Süan-hua fu, north-west of Peking, Chili Province, bones from the extremities of a mammal and a nasal bone fragment, which were sent to Paris and determined by GAUDRY[4] as belonging to *Rhinoceros antiquitatis;* and in 1903 M. SCHLOSSER[5] was able to show that this species had once been distributed as far south as the Yang-tse.

The famous naturalist A. R. WALLACE[6] wrote in 1876 that in northern

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[1] The alligator is now extinct in the Yang-tse, but has risen to life again in the ancient bone carvings of Ho-nan, and is represented in several excellent specimens in the Field Museum obtained with many others from the late F. H. Chalfant.

[2] Contributions towards the Mat. Med. of China, p. 185. Not all "dragon-teeth" (*lung ch'i*), however, originate from the rhinoceros. A number of these gathered by me in a drug-store of Hankow and now in the American Museum of New York (Cat. No. 13,847) were examined by the palæontologist Mr. B. Brown, and contained five teeth of Rhinoceros, one tooth of Mastodon, two teeth of Hipparion (1 m^3), and one tooth (P_3) of an undescribed Hipparion. The palæontologist M. Schlosser of Munich (see below) has devoted a careful study to these teeth with remarkable results. Rhinoceros-teeth were employed for medicinal purposes as early as the middle ages. In the Annals of the Sung Dynasty (*Sung shi*), Biography of Ts'ien Shu (929–988; GILES, Biographical Dictionary, p. 144), there is a record that in the year 963 this prince, ruler of Wu and Yüe, sent as tribute ten thousand ounces of silver, one thousand single rhinoceros-teeth (*si ya*), fifteen thousand catties of perfume and drugs, and a hundred wrought objects of gold, silver, genuine pearls, and tortoise-shell (*P'ei wên yün fu*, Ch. 21, p. 114 b). For the year 983, a tribute of rhinoceros-teeth is recorded in the same Annals as having been sent from San-fo-ts'i (Palembang on the north-east coast of Sumatra).

[3] *China Review*, Vol. V, 1876, p. 69.

[4] *Bulletin de la société géologique de France*, Vol. XXIX, 1871-72, p. 178.

[5] Die fossilen Säugetiere Chinas (see below), p. 56.

[6] The Geographical Distribution of Animals, Vol. I, p. 123.

China remains of *Hyæna*, *Tapir*, *Rhinoceros*, *Chalicotherium*, and *Elephas*, had recently been found, closely resembling those from the Miocene or Pliocene deposits of Europe and India, and showing that the Palæarctic region had then the same great extent from west to east that it has now. Of two species,—complete carcasses with the skin,—the two horns, hair, and well-preserved interior organs, were discovered in frozen soil between the Yenisei and Lena Rivers in Siberia.[1] They lived during the ice age, and were covered with a coarse hairy and finely curled coat, the skin being smooth and without the characteristic folds of the now living species. K. A. Zittel[2] defines the zone of these two species (*Rhinoceros mercki* and *antiquitatis*) as extending over the whole of northern and central Asia, inclusive of China, and over northern and middle Europe.[3] The best study of this subject, thus far, has been made by M. Schlosser.[4] He records a new species from China (*Rhinoceros habereri*)[5] in two different types, and two others belonging to the forest fauna, one of which is referred to the two-horned Sumatran type, and the other (*Rhinoceros brancoi*) possibly to the single-horned Indian species. This fact is in striking agreement with the result of our historical investigation, according to which these two species were known to the ancient Chinese and distinguished by the two names *si* and *se*. In view of the acquaintance of the Chinese with these two species, the question as to the age of the fossil remains is, of course, important. According to the researches of Schlosser, the number of species of fossil rhinoceroses traceable in China amounts to at least seven, three of which originate from the Pleistocene, four from the Pliocene; and Schlosser was able to prove that *Rhinoceros sinensis Owen* does not represent a species from the Tertiary, as presumed heretofore, but should be rather one from the Pleistocene.[1] There is, accordingly, from a geological viewpoint, good reason to believe that several species of rhinoceros could have survived on Chinese soil down to the historic period when man made his first appearance there;[2] and it is in the records of the Chinese that this fact has been preserved to us. It even seems to me (but this is the mere personal impression of a layman, which may not be acceptable to a specialist in this field) that the Chinese records, in a highly logical manner, fill a gap between the palæontological facts of Siberia and the present-day existence of the hairy two-horned rhinoceros in south-eastern Asia. If it is admissible to identify the Siberian *tichorhinus* with the latter species, or to consider the former as the primeval ancestor of the latter, it is conceivable that the Siberian animal, pressed by the advance of the ice, started on a migration southward, and first halted in northern China, where it became the *si* of the Chinese, and whence it finally proceeded south-east. Whatever this fancy may be worth, there can be no doubt of two points,— first, that the ancient Chinese, from the very beginning of their history, were acquainted with two species of rhinoceros, the single-horned and the two-horned ones, distinguished as *se* and *si;* and, second, that the former is identical with the present *Rhinoceros indicus unicornis* (as proved above all by the linguistic relationship of the word *se* with Tibetan *bse* and Lepcha *sa*), and the latter with the present *Rhinoceros sumatrensis*.[1]

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[1] This first find was made in 1771 on the bank of the river Wilui near 64° N. lat. It was first described by the prominent naturalist P. S. Pallas, in his treatise De reliquiis animalium exoticorum per Asiam borealem repertis complementum (in *Novi Commentarii Acad. Scient. Petropolitanae*, Vol. XVII, 1772, p. 576), and in his Reise durch verschiedene Provinzen des russischen Reichs (Vol. III, p. 97, St. Petersburg, 1776). Head and feet of this animal are still preserved in St. Petersburg. A fundamental investigation still remains that of J. F. Brandt, De rhinocerotis antiquitatis seu tichorhini seu pallasii structura externa etc. (*Mémoires de l'Acad. de St. Pétersbourg*, series 6, Vol. V, 1849, pp. 161–416). A rich collection of rhinoceros-bones made in the western part of Transbaikalia is in the Museum at Troitskosavsk (compare Molleson, in *Papers of the Troitskosavsk-Kiachta Section of the Russian Geogr. Soc.*, in Russian, Vol. I, 1898, p. 71; and the detailed descriptions of Mme. M. Pavlov, *ibid.*, Vol. XIII, 1910, pp. 37–44).

[2] Palæozoologie, Vol. IV, p. 296. For a restoration of the woolly rhinoceros found in Siberia see N. N. Hutchinson, Extinct Monsters, Plate XXI.

[3] We know that fossil rhinoceros-horn had attracted the attention of Siberian natives long before it came to the notice of European scientists. It was employed to strengthen their bows, and the belief was entertained that it exerted a beneficial influence on the arrow hitting its mark. (Compare A. E. v. Nordenskiöld, Die Umsegelung Asiens und Europas auf der Vega, Vol. I, p. 367, Leipzig, 1882.) Now we read in the Annals of the Kin Dynasty (*Kin shi*, Ch. 120, p. 3 a) that the Niŭchi, a Tungusic tribe, availed themselves of rhinoceros-horn for the same purpose; and it may therefore be presumed that they obtained it through the medium of trade from inner Siberia (compare above, p. 95). Fossil rhinoceros-horns have also been found in the valley of the Kolyma River. K. v. Ditmar (Reisen und Aufenthalt in Kamtschatka, Vol. I, p. 37, St. Petersburg, 1890) saw one from that region nearly three feet long, and emphasizes the co-existence there of numerous remains of rhinoceros, mammoth, and narwhal.

[4] Die fossilen Säugetiere Chinas (*Abhandlungen der bayer. Akademie*, Cl. II, Vol. XXII, 1903, pp. 1–221, 14 plates). This work is conveniently summed up by H. F. Osborn (The Age of Mammals, pp. 332–335), where an interesting map (p. 505) is added, showing the former and recent distribution of the rhinoceros. The material described by Schlosser is derived from Chinese drug-stores, and was collected by K. Haberer. The author gives also a valuable summary of the localities in China where fossil remains of mammals have been found (pp. 9–19).

[5] *L. c.*, pp. 58–63.

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[1] *L. c.*, p. 52.

[2] We owe to M. SCHLOSSER an interesting discovery in regard to the age of man on Chinese soil. He describes (pp. 20–21) and figures a tooth, a molar (m_3) of the left upper jaw, which originates either from man or from a new anthropoid. This tooth is perfectly fossilized, wholly untransparent, and shows between the roots a reddish clay, such as is found only in teeth really coming from the Tertiary, and not from the loess; so that the author is inclined to ascribe to it a tertiary origin, or at all events, a very great age, going back at least to old Pleistocene. A definite solution of the problem cannot be reached at present. "The purpose of this notice is," concludes SCHLOSSER, "to call the attention of subsequent investigators, who may have an opportunity of undertaking excavations in China, to the possibility that either a new fossil anthropoid or tertiary man, or yet an old-Pleistocene man, might be found." I agree with Schlosser on this point, and regard his discovery, which certainly so far remains entirely hypothetical, as highly suggestive, and pointing in the direction of a future possibility of a new Pithecanthropus being discovered in Chinese soil.

We may now attempt something like a reconstructive history of the rhinoceros in the historical era. At the time of the *Shi king*, the rhinoceros was known to the Chinese as a game-animal. In a song celebrating a hunting-expedition by King Sūan, it is said, "We have bent our bows: we have our arrows on the string. Here is a small boar transfixed; there is a large rhinoceros (*se*) killed." [2] As a metaphor, the name of the animal is employed in another song, in which soldiers constantly occupied on the war-path complain of cruel treatment, and say, "We are not rhinoceroses, we are not tigers, to be kept in these desolate wilds." [3] Also cups carved from rhinoceros-horn (*se kung*) [4] make their début in the *Shi king;* and from the passages where it is mentioned, an apparent symbolism is connected with it. In the region of Pin it was customary for the people in the tenth month to visit the palace of their prince with offerings of wine, and "to raise the cup of rhinoceros-horn with wishes for numberless years without end." [5] In another song, a woman yearning for her absent husband takes a cup of wine poured out of a rhinoceros-horn, in the hope that her grief will not last forever.[6] The idea of the healing property of the horn is possibly here involved.

In the *Shu king*, embodying the most ancient historical records of the nation, the rhinoceros is not directly mentioned, but one of the two principal products yielded by it is alluded to. At least, this is the opinion of the Chinese commentators. In the chapter entitled Tribute of Yü (*Yü kung*), "teeth" and "hide" are stated to have been the produce of the two provinces Yang-chou and King-chou,—the former covering the littoral territories south and north of the Yang-tse delta; the latter, the present area of Hu-nan and Hu-pei. The term "teeth" is interpreted as ivory; the term "hide," as rhinoceros-hide.[1] This inference is very reasonable, for the tributes or taxes of those territories cannot have been any ordinary animal teeth or hides of any kind, but they certainly were those teeth and hides most highly prized in the Chou period,— and these were ivory, and rhinoceros-hide desirable for body armor.[2] The sovereigns of the Chou dynasty hunted the rhinoceros. In B.C. 965, as recorded in the Annals of the Bamboo Books, Chao Wang invaded the country of Chʻu, and crossing the Han River, met with a large single-horned rhinoceros (or rhinoceroses). Yi Wang, in B.C. 855, captured, when hunting in the forest of Shê, a two-horned rhinoceros, and had it carried home.[3]

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[1] It would now be appropriate to introduce for the two extinct Chinese species the names *Rhinoceros unicornis* var. *sinensis* (Chinese *se*), and *Rhinoceros bicornis* var. *sinensis* (Chinese *si*).

[2] *Shi king*, ed. LEGGE, p. 292.

[3] *Ibid.*, p. 424.

[4] Nos. 6393 and 6398. The two characters are read *kung* (according to *T'ang yün*) and *kuang* (according to *Shuo wên*).

[5] *Ibid.*, p. 233. The rhinoceros belongs to the long-lived animals. "Individuals have lived for over twenty years in the London Zoölogical Gardens, and it is stated that others have been kept in confinement for fully fifty years. Consequently there is no doubt that the animal is long-lived, and it has been suggested that its term of life may reach as much as a century" (R. LYDEKKER, The Game Animals of India, p. 31).

[6] *Ibid.*, p. 9.

The rhinoceros was also pictured at an early date. When the emperor mounted his chariot, they posted on both sides of it the lords, whose chariots had red wheels, two crouching rhinoceroses being represented on each wheel; and they posted in front the lords, whose chariots had red wheels with a single tiger represented on each wheel.[4] This juxtaposition of rhinoceros and tiger is noteworthy, for it turns up again in Chuang-tse: "To travel by water and not avoid sea-serpents and dragons,—this is the courage of a fisherman. To travel by land and not avoid the rhinoceros and the tiger,—this is the courage of hunters." [1] And in Lao-tse's *Tao tê king* (Ch. 50): "He who knows how to take care of his life, when travelling by road, never meets rhinoceros or tiger; when entering the army, he does not require defensive or offensive armor. The rhinoceros, therefore, finds no place where to insert its horn, the tiger where to lay its claws, the soldier where to pierce him with his sword." [2] Finally in the passage of *Lun yü* [3] already referred to.

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[1] Legge, Chinese Classics, Vol. III, pp. 111, 115; Couvreur, Chou King, pp. 71, 73 (see also Hirth, The Ancient History of China, p. 121). Legge remarks, "This view is generally acquiesced in. Are we to suppose then that the rhinoceros and elephant were found in Yang-chou in Yü's time? They may very well have been so. Hu Wei observes that from the mention or supposed mention of these animals some argue for the extension of the limits of the province beyond the southern mountain-range to Kuang-tung, Kuang-si, and Annam, and replies that the princes might be required to send articles of value and use purchased from their neighbors, as well as what they could procure in their own territories." This conclusion of Hu Wei is quite unnecessary. It is merely elicited by the school opinion that the geographical distribution of animals must have been the same anciently as at present. There can certainly be no more erroneous view. Nothing in nature remains unchangeable. All the large mammals formerly had a far wider range, gradually narrowed by natural events and human depredations. We are simply forced to admit that the rhinoceros, as well as the elephant, existed in Yang-chou and King-chou in the times of antiquity. This logically results from the Chinese records, and is a logical inference from a zoögeographic point of view. No jugglery or sophistry, like extension of geographic provinces, misunderstanding of words, or introduction of bovines, is necessary to explain and to understand a fact of such simplicity as this one.

[2] The skin of the rhinoceros was utilized in the Chou period also for the manufacture of a yellow glue employed for the purpose of combining the wooden and horn parts of a bow (*Chou li*, XLIV, Biot's translation, Vol. II, p. 586). The commentator Wang Chao-yü of the twelfth century justly adds that either skin or horn can be made into glue, but that, as far as the rhinoceros is concerned, only the skin is laid under contribution to this end. Naturally, since the horn is too valuable. Chêng Kʻang-chʻêng assures us that in his time (second century A.D.) the stag-glue was exclusively made from the antlers. It is hardly conceivable that Yang-chou and King-chou should have sent as tribute bovine hides which could be obtained everywhere: the specification of these territories implies a specific material peculiar to them; of wild bovines there, nothing is known.

[3] Legge, Chinese Classics, Vol. III, Prolegomena, pp. 149, 153; Biot's translation of *Chu shu ki nien*, pp. 41, 46 (Paris, 1842). Note that the idea of the monoceros *kiai-chai* originated in the country of Chʻu (above, p. 115, note 2). In the Chʻun-tsʻiu period, as it appears from a passage of *Tso chuan* (Legge, Chinese Classics, Vol. V, p. 289), both *se* and *si* were still plenty.

[4] Chavannes, Les Mémoires historiques de Se-ma Tsʻien, Vol. III, p. 214.

The extermination of wild animals made rapid progress; the gradually advancing Chinese agriculturist cleared the hills and deforested the plains in order to till the ground and to yield the means of subsistence for the steadily increasing populace. The famous passage in *Mêng-tse* [4] is of primary importance: Chou-kung, the organizer of the government of the Chou dynasty, broke the rebellions and established peace throughout the empire; "he drove far away also the tigers, leopards, rhinoceroses, and elephants,—and all the people was greatly delighted." Toward the end of the Chou period (middle of the third century B.C.) the one-horned rhinoceros was, in all likelihood, extinct in northern China; and the two-horned species had gradually withdrawn, and taken refuge in the high mountain-fastnesses of the south-west. The strong desire prevailing in the epoch of the Chou for the horn of the animal, which was carved into ornamental cups, and for its valuable skin, which was worked up into armor, had no doubt contributed to its final destruction in the north. So there is no reason to wonder that to the later authors the extinct animal *se* was a blank, and offered a convenient field for fanciful speculations. [5]

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[1] GILES, Chuang Tzŭ, p. 214.

[2] Compare S. JULIEN, Le livre de la voie et de la vertu, p. 183. It is noticeable that the word *kia*, which in Lao-tse's time designated a cuirass of rhinoceros-hide, appears here in close connection with the rhinoceros.

[3] LEGGE, Chinese Classics, Vol. I, p. 307.

[4] LEGGE, The Chinese Classics, Vol. II, p. 281.

[5] It is a well-known phenomenon in all languages that newly-discovered animals are named for those already known, for example, that sea-mammals are named for land-mammals to which they bear some outward resemblance, or insects for larger animals. Thus we know a rhinoceros-beetle (*Oryctes rhinoceros*) with horns or processes on its head (see *Science*, 1913, p. 883), and a rhinoceros-bird or hornbill (*Buceros rhinoceros*) noted for the extraordinary horny protuberance on the crest of its bill. These examples certainly do not mean that our word "rhinoceros" originally referred to an insect or a bird; but in our effort to coin a name for this beetle and bird, we happened to hit upon the rhinoceros, because certain characteristics of it were, by way of comparison, seen in the former. It is exactly the same when the Chinese, in literary

Se-ma Ts'ien, the father of Chinese history, who was born in B.C. 145, and died between B.C. 86 and 74, and who in his Historical Memoirs repeatedly mentions the two species, doubtless was personally familiar with them; for he locates them in Sze-ch'uan,[1] and we know that he, a great traveller and observer, accompanied the military expedition of the Emperor Wu sent in B.C. 111 into Sze-ch'uan and Yün-nan.[2] Again and again, Chinese authors in the beginning of our era point to that territory as the stronghold of the rhinoceros. We noticed that Kuo P'o of the third century alludes to Mount Liang in Sze-ch'uan as its habitat (p. 94); and we may add to this the weighty testimony of Ch'ang K'ü

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style, sometimes designate the buffalo "the water-rhinoceros" (*shui se*). In the pre-Christian era the word *se* invariably applied to the single-horned rhinoceros,—a fact confirmed by the concordance of the word with Tibetan (*b*)*se* (p. 116). In times following the ultimate extermination of this species on Chinese soil, this word naturally fell into disuse and became open to other functions; while *si* is still retained as the general word for rhinoceros, whether single or two horned. The word *se* was transferred to the buffalo, because to a naïve and primitive mind the two animals, as has been demonstrated by the world-wide propagation of this notion, bear a striking similarity to each other. The attribute "water" fits both with their fondness for lying embedded for hours in mud and water. A sequel of this transfer in meaning, then, was the impression of recent Chinese authors that the word *se* had denoted also the wild buffalo or ox in the times of antiquity. This, of course, is a phantom. The most instructive passage where the words *si* and *shui se* are used together in close succession occurs in *Sung shi* (Ch. 489, p. 1), where it is said, in the chapter on Champa (Chan-ch'êng), that "the country abounds in peacocks and rhinoceros (*si niu*), that the people keep yellow oxen and buffalo (*shui niu*), and that those engaged in the capture of rhinoceros and elephant (*si siang*) pay a tax on them to the king; they eat the flesh of wild goats and buffalo (*shui se*)." In Siam, permission to capture wild elephants must still be obtained from the Government, and for each animal caught a royalty of $150 is paid (C. C. HANSEN, *Daily Consular and Trade Reports*, 1911, p. 751). In mediæval times when the rhinoceros became gradually scarcer on Chinese soil, and the supply of its skin no longer satisfied the demand for it, buffalo-hide was substituted for it. Chinese authors, with fair accuracy, indicate the time when this change went into effect. A book *Ts'e lin hai ts'o*, quoted in the cyclopædia *Yen kien lei han* (Ch. 228, p. 4), states in substance that what is designated rhinoceros-hide armor in the T'ang History is at present made from buffalo hide, but continues under the general name "rhinoceros" (*si*). The Chinese, accordingly, were perfectly aware of the fact that the ancient cuirasses were wrought from rhinoceros-hide, and that buffalo-hide was a later substitute. Ch'êng Ta-ch'ang, who wrote in the latter part of the twelfth century, says in a discourse on defensive armor (inserted in *Wu pei chi*, published in 1621 by Mao Yüan-i, Ch. 105, p. 4) that the skin of a domesticated animal like the ox is always handy, while the two rhinoceroses *si* and *se* cannot be reared, and their skins are not always obtainable; and that in his time armor was produced from buffalo-hide. In *T'ang shu* (Ch. 41, p. 1) the tribute sent by the district of Kuang-ling in Yang-chou (circuit of Huai-nan) is stated to have consisted of armor made from buffalo-hide (*shui se kia*). The rhinoceros is here out of the question, as it did not occur in that region; and the geographical chapters of the T'ang Annals give us the best clew to the tracing of the geographical distribution of the rhinoceros in the China of that period. It is worthy of note that the term *shui si* ("water rhinoceros") is still employed with reference to the rhinoceros only, not the buffalo. Chung Kia-fu writing in 1845 (*Ch'un ts'ao t'ang chi*, Ch. 30, p. 13) makes the remark that "the cups and dishes carved from rhinoceros-horn (*si kio*) in his time are not from the genuine rhinoceros (*shui si*), but from the horn of a wild ox (*ye niu*) in the countries of the foreign barbarians."

[1] *Shi ki*, Ch. 117, p. 3 b.

[2] CHAVANNES, Les Mémoires historiques de Se-ma Ts'ien, Vol. I, p. XXXI.

of the period of the Tsin dynasty (265–419), who in his interesting work *Hua yang kuo chi* ascribes colossal rhinoceroses to the country of *Pa*, the ancient designation for the eastern part of Sze-ch'uan, and further places the animal in the district of Hui-wu, the present Hui-li in the prefecture of Ning-yüan, province of Sze-ch'uan.[1] However doubtful the exact date of the work *Pie lu* may be, the fact remains that it plainly indicates south-western China in its whole range as the geographical area of the rhinoceros (p. 135).

With their victorious advance toward the south-east in the third and second centuries B.C., the horizon of the Chinese people widened; and they encountered the two-horned rhinoceros also in Tonking.[2] The tributes of live rhinoceroses, sent to the Chinese Court from that region have been mentioned (p. 80). Liu Hin-k'i, author of the Records of Kiao-chou, of the fourth or fifth century, gives a perfectly correct description of the two-horned Annamese rhinoceros (p. 93). T'ao Hung-king, the universal genius of the fifth and sixth centuries, logically combines the ancient information relative to the south-west with the additional experience coming from the conquered south-east: Hu-nan, Yün-nan, and Kiao-chou in Tonking, according to him, represent the home of the rhinoceros (p. 136). This alliance of the two geographical zones is a fact of the greatest interest, for this observation of T'ao Hung-king incontrovertibly proves that the word *si* can but signify the rhinoceros, and particularly the two-horned species. When the Chinese first struck the rhinoceros of Annam, the matter is not reported as a novel experience; but they merely renewed an old experience which they had long before made in their own country, and applied the same familiar word to it. If the *si* of Tonking is the rhinoceros (and there is not an atom of doubt about it),[3] the *si* formerly recorded in Sze-ch'uan, Yün-nan, etc., must likewise be the rhinoceros; and T'ao Hung-king is our witness in establishing the identity of the animal as occurring in the Chinese and Indo-Chinese zones. This fact is borne out also by the coincidence of the definitions contributed by Kuo P'o and Liu Hin-k'i.

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[1] PLAYFAIR, No. 2480 (2d ed., No. 2341). The passages referred to are in *Hua yang kuo chi*, Ch. 1, p. 2 b; Ch. 3, p. 23 (ed. of *Han Wei ts'ung shu*).

[2] *Ts'ien Han shu*, Ch. 28 B, p. 17. Thus the pseudo-embassy of the Emperor Marc Aurel, presenting in 166 A.D. the Annamese products ivory, rhinoceros-horn and tortoise-shell, and mentioned in the Annals of the Later Han Dynasty (HIRTH, China and the Roman Orient, pp. 42, 176), was not the first to make the rhinoceros-horn of Annam known to the Chinese, who were acquainted with it at least two centuries earlier.

[3] The fact is still evidenced by present-day conditions and the continuous trade carried on at all times in rhinoceros-horn from Annam to China. Compare G. DEVÉRIA, Histoire des relations de la Chine avec l'Annam, pp. 41, 88 (Paris, 1880); S. W. WILLIAMS (The Chinese Commercial Guide, p. 94) states that the best sort of rhinoceros-horn comes from Siam and Cochinchina, selling at times for $300 apiece, while that from India, Sumatra, and southern Africa, represents an inferior sort, and sells for $30 and upwards apiece. For the middle ages we have the testimony of Chao Ju-kua (HIRTH's and ROCKHILL's translation, p. 46). As has been pointed out, the word *se* gradually sank into oblivion in the post-Christian era, and was superseded by the exclusive use of the word *si*, which was then applied also to the

In the T'ang period (618–906) the animal must have been plentiful in many parts of China. The geographical section in the Annals of that dynasty carefully enumerates the various articles sent up to the capital as taxes from every district; and it is the local products which come into question. Besides, rhinoceros-horn, as far as I know, was not imported at that time from beyond the sea. The present territory of the province of Hu-nan in central China seems to have then abounded in the animal,[1] for no less than eight localities within its boundaries are on record which furnished rhinoceros-horn to the Court: viz., Li-yang in Li chou, circuit of Shan-nan; Wu-ling in Lang-chou; K'ien-chung in K'ien-chou; Lu-k'i in Ch'ên-chou; Lu-yang in Kin-chou; Ling-k'i in K'i chou (modern Yung-shun fu); Kiang-hua in Tao-chou, circuit of Kiang-nan; and Shao-yang in Shao-chou. Rhinoceros-horn was further supplied from Lung-k'i in Tsiang-chou, from T'an-yang in Sü-chou, Sze-ch'uan; from Ts'ing-hua in Shi-chou (now Shi-nan fu) in Hu-pei Province; from Yi-ts'üan[2] in Yi-chou, province of Kuei-chou; from Annam; and elephants and rhinoceroses were sent from Ling-nan (Kuang-tung), forming the southern part of Yang-chou.[3] Is it conceivable that the tribute of those regions should have consisted of bovine horns which have hardly any commercial value? From mediæval times onward, as the geographical knowledge of the Chinese more and more advanced, and their intercourse and trade with the nations of the southern ocean increased, they became cognizant of the existence of the rhinoceros in India,[4] Java,[5] and Sumatra, and even

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single-horned rhinoceros. The rhinoceros of India is indeed designated *si* (*Hou Han shu*, Ch. 118, p. 5 b; *Nan shi*, Ch. 78, p. 7; *T'ang shu*, Ch. 221 A, p. 10 b). This proves again that the word *si* refers to the rhinoceros, and to this animal only.

[1] Hu-nan, as said before, is mentioned also by T'ao Hung-king. In this province formerly occurred both the rhinoceros and the elephant, furnishing hide and ivory, respectively, at the time of the Chou dynasty (HIRTH, The Ancient History of China, p. 121, and above, p. 159). In *Hu-nan fang wu chi*, "Records of the Local Products of Hu-nan" (Ch. 3, p. 14; edition of 1846), it is stated that there was rhinoceros-horn among the local products sent as tribute from Heng-chou; the text is quoted from *Kiu yü chi*, a geographical description of China, which, according to BRETSCHNEIDER (Bot. Sin., pt. 1, p. 162), was published in 1080 A.D.

[2] PLAYFAIR, Nos. 6381, 6713 (2d ed., No. 5701).

[3] PLAYFAIR, No. 8350 (2d ed. No. 3939). Compare *T'ang shu*, Chs. 40, pp. 1 b, 6 b; 41, pp. 9 a, 9 b, 10 a; 43, p. 1 a.

[4] See note 3 on p. 163.

[5] As regards Java, rhinoceros-horn is listed among its products in *T'ang shu* (Ch. 222 c, p. 3; and GROENEVELDT, *Miscell. Papers relating to Indo-China*, Vol. I, p. 139). The *Sung shi* (Ch. 489; GROENEVELDT, *ibid.*, p. 144) reports a tribute from Java

Africa. The interesting notes of Chao Ju-kua written in 1225,[1] eminently translated and interpreted by Hirth and Rockhill, afford an excellent view of all the localities from which rhinoceros-horn was traded to China, during the middle ages;[2] he refers to the Berbera coast as producing big horns (p. 128), and records them also for the island of Pemba (p. 149).[3]

Returning to China, we find trustworthy accounts, according to which the rhinoceros has persisted there in some localities at least down to the thirteenth century. Kuo Yün-tao, who composed an elaborate history of Sze-ch'uan in the thirteenth century,[4] states that the region of the aboriginal tribes of the south-west (*Si-nan I*) harbors a great number of rhinoceroses and elephants; and this agrees with the above statement of Su Sung (p. 140) that rhinoceros-horns came from Sze-ch'uan at the same period. As the author includes also the province of Kuei-chou, we are allowed to presume that the two-horned rhinoceros still inhabited the forests of Sze-ch'uan and Kuei-chou during the age of the Sung dynasty (960–1278).[5] In the year 987, as narrated in the Annals of the Sung Dynasty,[6] a rhinoceros penetrated from the southern part of K'ien into Wan-chou[7] where people seized and slew it,

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of short swords with hilts of rhinoceros-horn or gold, and records the word *ti-mi* as the native name of the rhinoceros. This word is not Javanese, in which the animal is called *warak*, but is presumably traceable to the Kawi language (compare the discussions of this word by G. Schlegel, *T'oung Pao*, Vol. X, 1899, p. 272; and P. Pelliot, *Bull. de l'Ecole française*, Vol. IV, 1904, p. 310).

[1] Pelliot, *T'oung Pao*, 1912, p. 449.

[2] At least as early as the fifth century, carved objects of rhinoceros-horn were traded to China from the Roman Orient and India (Hirth, China and the Roman Orient, p. 46). In the year 730 a tribute of rhinoceros-horn from Persia is mentioned (Chavannes, *T'oung Pao*, 1904, p. 51).

[3] The Geography of the Ming Dynasty (*Ta Ming i t'ung chi*, ed. of 1461, Ch. 91, fol. 20) lists rhinoceros-horn also among the products of Arabia (*T'ien-fang*). Under the Ming, rhinoceros-horn was imported to China from Champa, Cambodja, Malacca, Borneo, Siam, Bengal, and rhinoceros-flesh from Java. These data are derived from the *Si yang ch'ao kung tien lu* by Huang Shêng-tsêng, published in 1520 (reprinted in *Pie hia chai ts'ung shu*); this is the most convenient work on the countries of the Indian Ocean and on Chinese knowledge of them during the Ming, and gives more information than the Ming Annals.

[4] *Shu kien* (Ch. 10, p. 1), reprinted in *Shou shan ko ts'ung shu*, Vol. 23. The preface of Li Wên-tse is dated 1236.

[5] It might seem that the rhinoceros was extinct in China proper at the time of the Yüan period (1271–1367), judging from a remark made by Chou Ta-kuan, in his Memoirs on the Customs of Cambodja, to the effect that the latter country harbors the rhinoceros, elephant, the wild buffalo, and the mountain-horse, which do not occur in China (Pelliot, *Bulletin de l'Ecole française*, Vol. II, 1902, p. 169); but the passage is by no means conclusive, and may simply be interpreted in the sense that the author had never seen or heard of a rhinoceros in China.

[6] *Sung shi*, Chapter *Wu hing chi*, quoted in *T'u shu tsi ch'êng* (Chapter on Rhinoceros).

[7] Now the district of Wan in K'uei-chou fu, Sze-ch'uan Province.

keeping its skin and horn. It should be remembered that Li Shi-chên, who lived in the sixteenth century, still assigned to the rhinoceros the southern portion of Yün-nan and the adjoining Tibetan regions. Even at the present time the rhinoceros may still exist in isolated spots on Chinese territory.

JOHAN NEUHOF[1] locates it in the province of Sze-chʻuan, particularly near the small town of Po (Pʻa is presumably meant).

O. DAPPER[2] appropriates to the rhinoceros Sze-chʻuan and Chucheu-fu (?) in Kuang-si. DU HALDE[3] ascribes the rhinoceros to the prefecture of Wu-chou in Kuang-si. L. RICHARD[4] states, "On account of the devastation prevailing in Kuang-si, a great number of wild animals are found there: the tiger, rhinoceros, panther, tapir, wolf, bear, and fox." The zoölogist W. MARSHALL,[5] in a general summary of the Chinese fauna, observes that the south, and particularly the south-west, of China, harbor decidedly Indian types of mammals, among these the Indian tapir and the single-horned rhinoceros.

The products yielded by an animal, and the manner of their utilization, allow also conclusive evidence in regard to the nature of the animal itself. That rhinoceros-horn was worked in ancient times and well differentiated from other ordinary horn, is evidenced by the curious fact that three distinct verbs pertaining to the treatment of ivory, ordinary horn, and rhinoceros-horn, are listed in the dictionary *Erh ya*. The carving of ivory is designated by the word *ku* (No. 6248); the treating of ordinary horn (*kio*), by the word *hio*;[6] the carving of rhinoceros-horn (*si*), by the word *tsʻo* or *tsʻuo* (No. 11,766). In the latter case Mr. GILES, in the second edition of his Dictionary, has justly retained the meaning "to make rhinoceros-horn into cups; to carve." The word is apparently identical with *tsʻo* (No. 11,778), meaning "to file, trim, cut, plane, polish," etc., including all the various manipulations of the carver.

At this point it may not be amiss to call to mind the fact that a rhinoceros-horn is capable of being carved, but that the horn of a bovine animal cannot be carved. These horns, biologically, are entirely different in origin and structure. The Chinese were quite right in regarding the rhinoceros-horn as a marvel of nature, for it is a unique phenomenon of creation. It is composed of a solid mass of agglutinated hairs or bristles, and has no firm attachment to the bones of the skull, which are merely roughened and somewhat elevated so as to fit into the concave base of the solid horn. Ox, sheep, or antelope, however, have hollow horns; deer and giraffe, bony antlers. None of these is fit to be worked into a cup; and a cup carved from a horn can mean nothing but one carved from rhinoceros-horn. Horns of bovine animals, as we all know, may be utilized as drinking-vessels, or, as among primitive tribes, as powder-flasks, or, as among the Tibetans, even as snuff-bottles, or, as in India, to pour out holy water; but they are by nature made ready for use, and do not require any carving. The *se kung* of antiquity are certainly cups carved from rhinoceros-horn,[1] not cups of buffalo-horn, as Mr. GILES (No. 10,298) has it in the second edition of his Dictionary.

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[1] Die Gesantschaft der ostindischen Geselschaft, p. 348 (Amsterdam, 1669).

[2] Beschryving des Keizerryks van Taising of Sina, p. 230 (Amsterdam, 1670).

[3] A Description of the Empire of China, Vol. I, p. 121 (London, 1738).

[4] Comprehensive Geography of the Chinese Empire, p. 198 (Shanghai, 1908).

[5] Die Tierwelt Chinas (*Zeitschrift für Naturwissenschaften*, Vol. 73, 1900, p. 73).

[6] Composed of the classifier *kio* ('horn') at the foot, and the phonetic complement *hio* ('to learn'). The character is not contained in our current Chinese dictionaries (not even in PALLADIUS); students of Chinese will easily find it in K'ang-hi's Dictionary under classifier 148 (13 strokes, first character). The definition of the word *hio* given by the *Shuo wên* — *chi kio* ("to treat horn") — calls for attention, any word like cutting or carving being avoided. The ancient Chinese were familiar with all processes of horn-work (soaking, slicing, welding, etc.), which are described in the *Chou li*.

Naturally, none of those ancient drinking-horns has survived, but at a later time they were imitated in bronze. There are, at least, some bronze drinking-cups preserved, which are connected by Chinese archæologists with the drinking-horns of antiquity. In the *Po ku t'u lu* (Ch. 16, p. 16) an illustration (Fig. 23) is given under the title *Han hi shou pei* ("cup with the head of a sacrificial bull, of the Han period"). A similar bronze (Fig. 24) is figured in the *Kin shi so*, with the legend *Chou se kung* ("rhinoceros-horn cup of the Chou period").[2] The text of the *Po ku t'u lu* quotes the passage of the *Shi king* in which the *se kung* are spoken of (above, p. 159), and says that this bronze cup comes very near to them. The bull-head is certainly a feature which originated only subsequently in bronze-casting, when the accepted forms of the horn cups were imitated in bronze. It is noticeable that the cup, as figured in the Sung Catalogue of Bronzes, corresponds in a measure to the form of a rhinoceros-horn inverted and hollowed out from the base.

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[1] Likewise PALLADIUS (Vol. I, p. 136) and COUVREUR (p. 451).

[2] The authenticity of the specimen of the *Kin shi so* seems somewhat contestable. The head is that of a stag, but is equipped with ox-horns. The dating in the Chou period is arbitrary and unsupported by evidence. It is remarked in the explanatory text that it is not known whether the piece is a rhinoceros-horn cup (*se kung*). The similarity of the two specimens (Figs. 23, 24) with the rhyton of the Greeks is apparent, but there is no necessity of assuming an historical interrelation of the two types. Both were independently developed from natural horns used as drinking-cups, which were subsequently imitated in more durable materials, like clay and metal. Moreover, the Greek rhyton has a feature lacking in the Chinese specimens,— a single oblong loop-handle.

As stated by a great number of commentaries,[1] the *se kung* were carved from wood if rhinoceros-horn were lacking. Certainly, there could have never been any want of bovine horns; and it is inconceivable that an ox-horn should have been ever reproduced in wood. Fan Ch'êng-ta, in his *Kui hai yü hêng chi*,[2] has a note to the effect that "the people on the seacoast make cups from ox-horn (*niu kio pei*) by splitting the horn in two and smoothing the edges to enable them to drink wine from them, which appears as a survival of the ancient rhinoceros-horn goblets." They did not carve their cups from ox-horn, however: they merely split the latter, as the author advisedly says.[3]

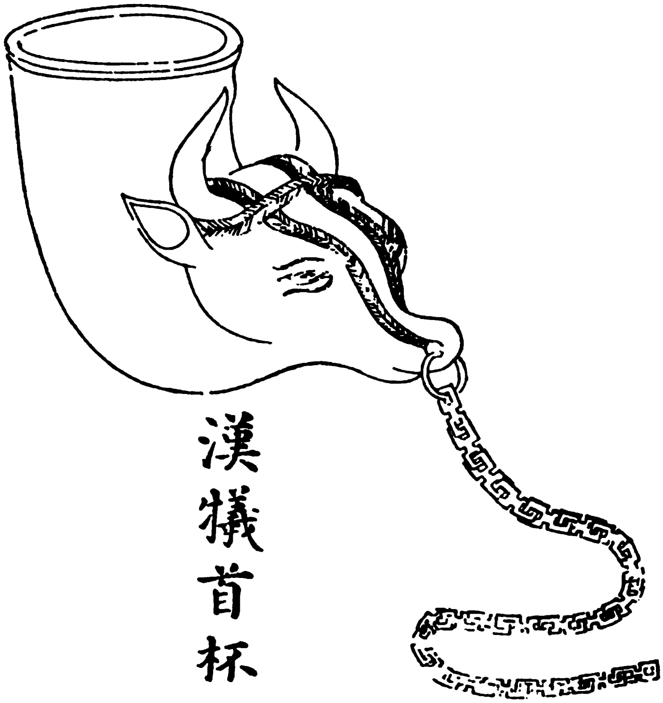

FIG. 23.
Bronze Rhyton attributed to Han Period (from *Po ku t'u lu*).

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[1] See *T'u shu tsi ch'êng, K'ao kung tien*, sect. 197, *kung pu*.

[2] Edition of *Chi pu tsu chai ts'ung shu*, p. 14 b.

[3] It may be stated positively that a confusion of rhinoceros and ox horns (or any other horns) is absolutely impossible, the two being entirely distinct organic substances of different origin and structure; and we are quite willing to believe Chang Shi-nan, the author of *Yu huan ki wên* early in the thirteenth century, that an artisan of Shuang-liu hien in Ch'êng-tu fu, who chanced upon the idea of making ox-horn into rhinoceros-horn, was not very successful in passing off his ware, because it did not exhibit any of the properties of rhinoceros-horn. The latter is indeed a unique product

The *Chou li* has a report on the office of the horn-collectors (*kio jên*) whose task it was to collect teeth, horns, and bones in mountains and marshy places.[1] Chêng K‘ang-ch‘êng of the second century A.D. comments that the big ones among these objects came from the elephant and rhinoceros, those of small dimensions came from Cervidae. They did not pick up ox-horns. The word *kio* ("horn") is used also in the sense of a vessel carved from horn; and there are several types of ancient bronze vessels, the names of which are written with characters combined with the classifier *kio* ("horn"). This would hardly be the case if these various bronze forms did not go back to older vessels carved from horn. He who will study the illustrations of these cups in the *Po ku t‘u lu*, or in the *T‘u shu tsi ch‘êng*, where they are reproduced after the former work, will be struck by the fact that they do not exhibit the slightest resemblance to ox-

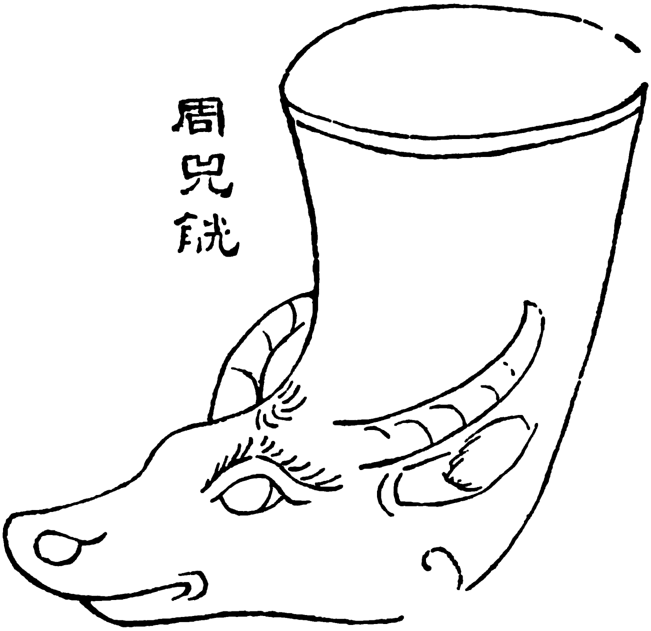

FIG. 24.
Bronze Rhyton attributed to Chou Period (from *Kin shi so*).

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of nature and has no substitute. A very interesting piece of ancient Japanese pottery in the Imperial Museum of Tōkyō (figured by N. G. MUNRO, Prehistoric Japan, p. 483) is made in imitation of an animal's horn, bearing a striking resemblance to a rhinoceros-horn.

[1] BIOT, Chou li, Vol. I, p. 378. The *Chou li* describes the rhinoceros-horn as yellow (Vol. II, p. 586).

horns, but display most elegant shapes of soft, rounded outlines, such as could have been carved only from rhinoceros-horn. Moreover, these horn vessels were differentiated according to their capacities: the vessel *kio* (No. 2218) containing one pint (*shêng*); the vessel *ku* (No. 6221), two pints; the vessel *chi* (No. 1925), three pints;[1] the vessel *kio* ("horn"), four pints;[2] the vessel *kung* or *kuang* (No. 6393), seven pints. All of these served the same purpose,—they were filled with wine; and the ancient tradition is that the bad or tardy disciple, or whoever had violated a rule or lost a game, was forced to empty the horn at a draught by way of punishment.[3] Now, there could be no greater absurdity than to suppose that these drinking-horns were veritable ox-horns, whether from a wild or domesticated ox, and were emptied at a draught by those wretched fellows. Every former German student knows from experience that an ox-horn contains such a volume of liquor, that even the strongest drinker in the world could not empty it at a draught; and every one who has lived among the Chinese is acquainted with those tiny bits of porcelain cups from which they enjoy their hot rice-wine during meals, and knows how limited their abilities *in Baccho* are. The punishment of forcing a negligent student to do away with a quantity of wine contained in a buffalo-horn would certainly have been most efficient in killing him instantly and saving further trouble about him; that, however, was not the intention of the law-giver. Naturally, these drinking-cups of early antiquity were nothing but miniature cups carved from rhinoceros-horn. Indeed, it is the very horn of the rhinoceros, which renders this cup eligible as a fit means of correction, for "the horn of the rhinoceros is terrible to its enemies; and for this reason the holy emperors of old, in condemning a man to empty a cup by way of punishment, wanted it to be made from rhinoceros-horn."[4] The terror which the animal was able to inspire in man should be brought home to the mind of the culprit, and this was the essential point of his punishment. Similar was the idea when the rhinoceros-horn cup was emptied on the occasion of a vow; as in the case of the three lords who pledged fidelity to the King of Tsin, with imprecations of calamities to themselves should they break their word.[1] As Wang Fu says in the *Po ku t'u lu* (quoted above, p. 131), the rhinoceros represented on the bronze wine-kettles of the Shang period was a fit emblem to serve as a warning to the drinker, and to inculcate in him moderation: as the rhinoceros is capable of doing injury to man, so excessive indulgence in spirits might harm him.[2]

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[1] According to *Shuo wên* (Ch. 11, p. 4), four pints; while the vessel *shang* (No. 9744) held three pints.

[2] Compare the dictionary *Kuang ya* by Chang I, written in the first part of the third century (Ch. 8, p. 5 b; edition of *Han Wei ts'ung shu*).

[3] Compare BIOT, Choû li, Vol. I, p. 259; Vol. II, p. 17. In one passage of the *Li ki* (ed. COUVREUR, Vol. II, p. 618), horns (together with *kia*) appear as sacrificial cups, from which to pour out libations to the ancestors.

[4] According to *Yün hui*, as quoted by A. TSCHEPE (Histoire du royaume de Tsin, p. 308, Shanghai, 1910).

We now recognize that the rhinoceros, looked upon as a moral and educational factor, moves on the same line as the monoceros *hiai-chai* discussed above (p. 115), which is able to decide judicial proceedings.[3] This inward affinity proves that this monoceros is a legitimate offshoot of the rhinoceros. We have seen that the single-horned rhinoceros *se* existed in the country of Ch'u in the beginning of the Chou dynasty (p. 160), and it was among the people of Ch'u that the notion and word *hiai chai* originated (p. 115). The transformation into a goat of what originally was the rhinoceros was developed by the notion of "butting" under the influence of a legend emanating from Ch'u, which unfortunately is lost.

In past times the rhinoceros was so plentiful in the home of the Chinese, that carvings from its horn belonged to the common household objects, especially at the period before the utilization of metals, when wood, bone, horn, antler, and stone furnished the material for the making of implements.

There are other objects stated to have been made of rhinoceros-horn, where the supposition that ox-horn might be involved is again out of the question. In the biography of Li Se, who died in B.C. 208,[4] objects carved from rhinoceros-horn and ivory (*si siang k'i*) are mentioned, and classed among *objets de vertu.*[5] Implements of ox-horn would certainly not rank in this category. According to *Hou Han shu*,[6] seals were cut out of rhinoceros-horn and ivory. Everybody knows the square and rectangular cubes in which Chinese seals are shaped, and to cut such a seal out of ox-horn is impossible.

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[1] Tschepe, *l. c.* The warlike character of the rhinoceros is still indicated by the literary designation *Si pu* for the Board of War (*Ping pu*) and the rhinoceros forming the badge of the ninth grade of the military officials.

[2] The rhinoceros as a means of punishment appears also in the case of Wan of Sung, who paid the penalty of his crimes by being bound up in a rhinoceros-hide (*Tso chuan, Chuang kung*, twelfth year: Legge, Chinese Classics, Vol. V, p. 89).

[3] In the time of the philosopher Wang Ch'ung, who wrote his work *Lun hêng* in 82 or 83 A.D., Kao Yao and this creature were painted in the courtyards of public buildings; the latter, in agreement with the ancient definitions, apparently as a goat with a single horn, for it instinctively knew the guilty. When Kao Yao administered justice and entertained doubts of a man's guilt, he ordered this goat to disentangle the case: it butted the guilty party, but spared the innocent (Forke, Lun-hêng, pt. II, p. 321).

[4] Giles, Biographical Dictionary, p. 464.

[5] *Shi ki*, Ch. 87, p. 2 b.

[6] Ch. 40, p. 5 a.

Finally, the memorable passage in the *Chou li* from which we started, and that is discussed in the following chapter, regarding the manufacture of hide armor, is sufficient evidence in itself that the hide in question is only that of the rhinoceros. Mr. Giles renders the words *se* and *si* indiscriminately by "bovine animal;" it is manifest, however, from the text in question, that *se* and *si* are two distinct animals, but can by no means be two distinct bovine animals. It will be seen that the *Chou li* speaks of three kinds of cuirasses, — those made from the hide of the two-horned rhinoceros (*si*), which consist of seven layers, and will last a hundred years; those made from the hide of the single-horned rhinoceros (*se*), which consist of six layers, and will last two hundred years; and those made from a combination of both hides, which consist of five layers, and will last three hundred years. The skin of the rhinoceros was utilized for the manufacture of hide armor, because it was the thickest and strongest known in the animal kingdom,[1] and because the rhinoceros was justly considered a strong, warlike, and long-lived creature (see p. 159); and the qualities of the animal were believed to be transfused into the body of the wearer of the cuirass. The single-horned rhinoceros was the bigger and stronger of the two species known; and for this reason armor from its hide was believed to last twice as long as that of the two-horned kind. We notice that there is a close interrelation between the number of layers of the hide and the number of years that the armor is supposed to endure. All this becomes intelligible only if we interpret the two words *se* and *si* in the manner that has been proposed.[2] But what would the interpretation be if the armor of the Chou had been made from the hide of wild bovine animals? The passage, in this case, could receive no intelligent and convincing interpretation. That bovine hide can be utilized in the making of armor, nobody denies. It is utterly inconceivable, however, that the ancient Chinese should have taken the trouble to hunt wild bovine animals, in order to secure their skins for cuirasses, since they were in possession of plenty of domestic cattle from which leather was obtainable; and this one certainly could have been employed with greater facility and the same result for the purpose of defence. And if they had really employed cowhide to this end, why should the *Chou li* not simply state that cuirasses were made of this material (*niu p'i*)? Why should it introduce the story of two wonderful animals *se* and *si*, interwoven with religious beliefs of longevity, if nothing but a mere every-day cowhide was at issue? On the other hand, there is every reason to believe that the skin of ox or cow was never, for religious reasons, employed in ancient China in the making of armor. The ox was a sacred, and in a measure inviolable animal, looked upon as the helpmate in gaining man's daily bread. He was the animal sacrificed to the deities Heaven and Earth. There is no account to the effect that neat-leather was ever employed for cuirasses; while the tradition that rhinoceros-skin is a fit material for this purpose, as we saw, has been maintained even by later authors.

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[1] The toughness and durability of rhinoceros-hide are indicated also by its utilization in the coffin of the Son of Heaven, which was fourfold. The innermost coffin was formed by hide of water-buffalo and rhinoceros, each three inches thick. This leather case was enclosed in a coffin of white poplar timber; and this one, in two others of catalpa-wood (COUVREUR, Li ki, Vol. I, p. 184; LEGGE's translation in *Sacred Books of the East*, Vol. XXVII, p. 158).

[2] The fact that the general notion of leather and hide (*p'i ko*) was closely associated with rhinoceros-skin is evidenced by Yen Shi-ku defining that term by the words *si se* (*Ts'ien Han shu*, Ch. 28 B, p. 16 b).

II. DEFENSIVE ARMOR OF THE ARCHAIC PERIOD

> "Your subject has heard that the army of the Son of Heaven is rather maintained for the assurance of peace than for the purpose of aggressive war. The Empire and all its inhabitants being your own, is it worth while wasting a day's business on the land of the Barbarians, or driving a single horse to exhaustion on their behalf?"
>
> Memorial of HUAI-NAN-TSE to the Emperor Wu.

Defensive armor, as employed in the epoch of antiquity, is characterized by the absence of any metal.[1] During the Chou period (B.C. 1122–255) harness was exclusively made of hide (*lorica* of the Romans). Tsʻai Chʻên, in his commentary to the *Shu king* (published in 1210), makes this correct general observation on the subject: "In ancient canonical literature it is a question only of cuirasses (*kia*, No. 1167) and leather helmets (*chou*, No. 2463). Prior to the time of the Tsʻin, metal armor (*kʻai*, No. 5798) and metal helmets (*tou mou*, Nos. 11,424, 8041) were not in existence. The ancients availed themselves of hide for the making of armor (*kia*). From the time of the

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[1] It is not the object of the present investigation to give a detailed history of Chinese defensive armor of all periods, or to describe each and every type of armor mentioned in Chinese records. Such a task would require dwelling at great length on the military organization and activities of every dynasty, and would swell into several volumes of questionable practical value. It is merely my intention to outline the principal and conspicuous features of the general development of the matter, and to emphasize those types of armor which are of particular interest to the archæologist and ethnologist. Only those Chinese records which have a real value for an historical consideration of this subject are here exhibited. The theories of the philosophers and the later legendary inventions are historically worthless, and only interesting for what they are worth,— in their quality as philosophy, poetry, or folk-lore. A pure fable it is, for example, when the philosopher Kuan-tse makes Chʻi Yu (alleged B.C. 2698) the first inventor of metal armor (*kʻai*), and when as late a work as the *Tʻai po yin king* by Li Tsüan of the middle of the eighth century (WYLIE, Notes on Chinese Literature, p. 90) is gracious enough to ascribe to the same also the honor of having first cut hide into armor, and goes on to construct the evolutionary scheme that Shên-nung made weapons of stone, Huang-ti of jade, and Chʻi Yu of bright metal. The famous Tsʻao Chi (192–232) is credited with the statement that the former emperors bestowed on officials an armor (*kʻai*) called "brilliant like ink" (*mo kuang*) and another called "brilliant like light" (*ming kuang*), one suit of armor with a double seat in the trousers (*liang tang* [No. 10,727] *kʻai*), one suit of ring and chain armor (*huàn so kʻai*), and one suit of horse mail. This text is not well authenticated, and is hardly deserving of historical credence. The ring and chain armor is an anachronism in view of Tsʻao Chi's time; and any armor of the designation *kʻai* did not exist under the ancient emperors. The expression *huan so kʻai* occurring in this passage is explained in the dictionary *Chêng tse tʻung* as identical with *so kia* ("chain armor"). *Tʻu shu tsi chʻêng*, in reproducing this passage, writes *mo kuang*, as above; *Pʻei wên yün fu* has in its place *hei kuang* ("of black brilliancy"); and *Ko chi king yüan* has *li* (No. 6870) *kuang*, which seems to be a misprint. The two latter works write the character *tang* in the phrase *liang tang kʻai* without the classifier 145.

Ts'in and Han, iron armor and helmets (*t'ie k'ai mou*) gradually came into use. These two characters (*k'ai mou*) are formed with the classifier 'metal' (*kin*), for these objects were made from iron." This chronological division of words and matters, indeed, corresponds to the facts as expressed in the documents of literature. The comment of Ts'ai Ch'ên relates to the speech of the Prince of Lu, Po K'in, son of Chou Kung (*Shu king*, IV, 19), in which he admonished his soldiers to see that their cuirasses and helmets were well sewed together (that is, were in good order), and that the laces of their shields were well secured. In this passage the three means for making the complete defensive armor of the primeval epoch are named; and these are followed by the three principal representatives of offensive armor,— the bow, the long and the short spears.

We meet in the early period essentially two varieties of hide armor, distinguished by two different words, *kia* (No. 1167) and *kiai* (No. 1518). The latter, as will be seen (p. 195), was scale armor, composed of imbricated leather pieces which were cut out in the shape of scales (compare Plate XIV). The former was a cuirass made in imitation of a coat. Our knowledge of this device is mainly founded on the State Handbook containing the ritual and institutes of the Chou dynasty, the *Chou li*. A special office of armorers was instituted at the Court of the Chou dynasty; they were called *han jên*, "men who envelop (*han*, No. 3809) the body with a protective contrivance." The manufacture of these military leathern costumes is minutely described in the *Chou li*.[1]

"The armorers make the cuirasses (*kia*). Those made from the hide of the two-horned rhinoceros (*si*) consist of seven layers of hide; those made from the hide of the single-horned rhinoceros (*se*) consist of six layers; those made from a combination of both hides consist of five layers. The first endure a hundred years; the second, two hundred years; the third, three hundred years. In order to accomplish a cuirass, first, a form (dummy) is made,[2] and then the hide is cut in accordance with it. The hide pieces are weighed; and two piles equal in weight are apportioned, the one for the upper, the other for the lower part of the cuirass. The long strips, into which the hide has been cut up, are laid around horizontally. In general when the hide has not been properly cured, the cuirass is not strong;[1] when the hide is worn out, it will wrinkle. The method of inspecting cuirasses is as follows: the stitches, when examined, must be fine and close; the inner side of the hide must be smooth; the seams are required to be straight; the cuirass must perfectly fit into the case in which it is to be enclosed.[2] Then it is taken up,[3] and when examined, it must allow of ample space. When it is donned, it must not wrinkle. When the stitches are examined, and found to be fine and close, it is a sign that the hide is strong. When the inner side is examined, and found to be smooth, the material is well prepared and durable. When the seams are examined, and found to be straight, the cutting is perfect. When it is rolled up and placed in its case, it should fold closely. When, however, it is taken out, it should offer ample space to the wearer, and it is then beautiful.[4] When it is donned without wrinkling, it will gradually adjust itself to the form of the trunk."

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[1] BIOT, Vol. II, p. 506. The work of Biot is here, as in other instances, quoted for easy reference, as by referring to Biot the Chinese text may readily be looked up; but my rendering is based on the original text, and on several points deviates from that of Biot, and fundamentally, in this passage descriptive of armor.

[2] The dummy was patterned according to the figure of the individual for whom the cuirass was intended, and the hide was tailored and adjusted in correspondence with the dummy. It was left on the latter for some time, until it was thoroughly hardened and had assumed the required shape. The process was the same as that still practised on a smaller scale by the Chinese hatters, who fashion their caps over wooden models.

We gather from this account that the ancient hide corselets were not downright primitive affairs, but testify to an advanced stage of culture. Armor, as early as that archaic period, was individual, and carefully adapted to the shape of the body. Its weight was equally balanced between the upper and lower portions, the former reaching from the shoulders to the loins, the latter from the loins to the knees. Apparently it was but one uniform coat, without sleeves, and without any separate parts for protection, as nape-guards, greaves, knee-covers, or buskins.[1] The hide was well cured, and the inner side cleaned from all adhering impurities.

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[1] BIOT translates, "En général, si la façon n'est point parfaite, la cuirasse n'est pas solide." And COUVREUR (Dictionnaire chinois-français, p. 799), "Toute cuirasse d'un travail imparfait n'est pas solide." My rendering is based on the comment of Chêng Ngo.

[2] The cuirass was rolled up and encased in a covering, presumably of hide. This case was styled *kao* (No. 5949), a word now used in the sense of "quiver." Hide bags in which to preserve armor are still used in Tibet, and there is one in the Museum's collection. The Chinese now avail themselves of trunks with a special compartment in the lid for the helmet (compare Plate XLIII).

[3] The first test that the cuirass is exposed to refers to its fitting into the case; the second, to its fitting on the wearer; for this purpose it is taken out of the case.

[4] As will be seen from Biot's comment, the K'ien-lung editors hold that the last two qualities are difficult to reconcile, as, on the one hand, the cuirass must fit like a coat without throwing folds, and, on the other hand, must have ample space and splendor. I do not believe that this objection is very serious. The conditions stipulated in the text could all, indeed, be fulfilled. The essential requisite was elasticity to grant full freedom of motion; the cuirass must be tight-fitting, but if the hide is sufficiently elastic, "ample space" is secured to the wearer. Owing to its flexible character it could be readily rolled up, and, when taken out of its case, immediately reverted to its original shape, so that it could be donned without loss of time. The word *ming* ("brilliant") translated by BIOT "alors elle a de l'éclat," I believe, means something like "it is then in evidence, it fulfils its purpose."

My conception of the technicalities in the construction of this armor is widely different from that of BIOT based on the opinions of the Chinese commentators. These interpret that the cuirass made from the hide of the two-horned rhinoceros consisted of seven pieces sewed together; that from the hide of the one-horned rhinoceros, of six; and that made from a combination of both, of five pieces. There is no sense in this point of view of the matter. The commentators of the Han and later ages were unable to form a clear idea of the cuirass peculiar to the Chou period, because it was lost in their time; and they merely applied to the latter the notions which they had gained from a consideration of contemporaneous armor. The armor terminology of the Han was read into Chou armor, and a purely philological reconstruction was reached, which hardly corresponds to a living reality. The armor, as interpreted by the Chinese scholars, in my opinion, is technically impossible, and beyond our experience: armor-suits of such requirements have been made nowhere in this world, and in all likelihood never could have been made.[2]

There is no *raison d'être* in assuming that the first should have been made in seven, the second in six, and the third in five pieces; moreover, they double these figures, and conjecture that the upper portion (*shang lü*) and the lower portion (*hia lü*) each consisted of this number of pieces. But how can such an affair be realized? It is perfectly conceivable that a coat is composed of six pieces (two in front, two in the back, and two on the sides); any other even number — as four, eight, ten, or more — likewise is imaginable. It is not easily conceivable, however, as being incompatible with a normal state of affairs, that a cuirass should have consisted of seven or five pieces (or any larger odd number of pieces), as the Chinese commentators and Biot would have us believe. This supposition is not very reasonable. The symmetry of the human body inevitably results in principle in a strictly symmetrical style and technique of costume, and of armor especially: asymmetric armor nowhere exists.[1] Normal harness of the primitive stages of culture is usually composed of an even number of pieces; and for this reason, the Chinese interpretation is improbable. Even granted that another point of view is possible in theory, — that, for example, the harness of seven pieces may have had four in the back and three in front, or three in the back, two on the sides, and two in front, etc.,[2] — we still face the mystery of the threefold classification graduated according to age: what should be the reason that the cuirass of seven pieces is supposed to last a hundred years, that of six pieces two hundred years, and that of five pieces three hundred years? This is the salient point, to which no Chinese commentator has paid due attention; but it is obvious that this belief is associated with the two animals *si* and *se* furnishing the hide for the cuirasses, and that the supposed differentiation of the age of the two creatures is transferred to their products. Certain it is that the philological interpretation of the Chinese literati must be at fault. Their fundamental error lies in the misunderstanding of the word *shu;*[3] and in the venture of dragging in the terms *cha* (No. 127) and *ye* ("leaf"), which are peculiar to the Han period, but which did not exist with this meaning and with reference to armor in the age of the Chou. These two terms refer to laminæ or plates of hide or metal reinforcing armor (see pp. 196, 210), and it will be seen that this type of armor springs up only from under the Han. It certainly had not come into existence under the Chou, as proved by the description of the armor given above after the *Chou li*, in which those terms are absent. Again, it is an absurdity to speak of an armor consisting of seven, six, or five laminæ or plates, as these are of small dimensions, and a very large number of them is required to make a suit of armor.[1] The verdict of the Chinese scholars must therefore be repealed. It is solely to the very text of the *Chou li*, which is sound and sane, that we must appeal for a correct understanding of the structure of this cuirass.

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[1] Red knee-covers and buskins are mentioned in the *Shi king*, but they were outfits belonging to the costume of ceremony, not of war (LEGGE, Chinese Classics, Vol. IV, *Prolegomena*, p. 157, and p. 402).

[2] For technical reasons it is highly improbable that the hide armor of the Chou was sewed together from different pieces, because such a process would considerably diminish its strength and capability of resistance, and a blow struck at the seams would have had dangerous consequences. On the contrary, wherever hide armor was made, the principle was quite naturally developed to make it, as far as possible, in one piece; and this is exactly the point where the chief purpose of defensive armor comes in. If the Chou cuirass had been patched together from odd pieces, as the later Chinese philologists would make us believe, it could not have been a defensive armor proper, but simply a skin garment. W. HOUGH (Primitive American Armor, *Report U. S. National Museum*, 1893, p. 641) informs us that "American skin armor was always made in one piece folded over, sewed above the shoulders, leaving an orifice for the head and with a hole cut out of the left side for the left arm, the right side of the garment remaining open; the skin was often doubled, but more frequently the coat was reinforced with pieces of thick hide." Indeed, our Chou armor, *cum grano salis*, can have been no other in type and appearance than the hide armor of the American Indians, as figured on our Plate XI and by HOUGH on Plates XVI–XIX, although it may have been somewhat more elegant in its fit to the individual wearer. HOUGH (pp. 645, 646) furnishes several examples of the fact that hide armor in America was worked in several layers; thus, two, three, or more folds of the strongest hides were employed by the Nass Indians of the Tsimshian stock; a great many folds of dressed antelope-skins by the Shoshoni; and the Navajo singer chants of suits of armor made of several layers of buckskin. Likewise A. P. NIBLACK (The Coast Indians of Southern Alaska, *Report U. S. National Museum*, 1888, p. 268) states that the leather jerkins formerly made in Alaska were of one, two, or three thicknesses of hide, and in itself offered considerable resistance to arrows, spears, or dagger thrusts. Armor of rhinoceros-hide, according to Nachtigall, is still made and employed by the Arabs of the Sudan (H. SCHURTZ, Grundzüge einer Philosophie der Tracht, p. 114).

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[1] I am, of course, aware of the fact that in European armor, which is more or less artificial, a studied asymmetry is sometimes displayed (see, for instance, BASHFORD DEAN, Catalogue of European Arms and Armor, p. 64). The above remark refers only to the spontaneous productions of primitive cultures.

[2] Such an arrangement, moreover, I must confess, would appear to me as too sophisticated, and technically too complex for such a simple and primitive age as that of the Chou. In order to grasp the character of its culture-objects, we should collect experience from the life of primitive peoples as we actually observe it (compare Plate XI).

[3] The text unfortunately is very succinct, and merely contains the terms *ts'i shu*, *leu shu*, and *wu shu*. The Chinese commentators, accordingly, take the word *shu* (No. 10,061) in the sense of "hide pieces laid out side by side and then joined together," but this is a point which I venture to contest. In my opinion, the question can be satisfactorily decided, not only from a technological, but from a philological point of view as well, if we interpret the word *shu* in the sense of "strata, or layers of hide pressed together." The word *shu* is capable of assuming many significations; its original meaning is, "to adhere, to place one thing on another, to tie together,

We can understand, in my estimation, only that the suits were composed of seven, six, and five superposed layers or thicknesses of hide, respectively, as in fact hide armor has been produced. Then the whole passage becomes intelligible. There is a sensible gradation of three coats, regulated according to the quality believed to inhere in the hide. That of the two-horned rhinoceros ranks lowest in strength, therefore requiring seven layers,[2] and lasts only a hundred years. That of the single-horned rhinoceros, which is the stronger animal, is superior, therefore requiring only six layers, and yet it will last two hundred years. That of both kinds combined is the best and strongest of all, therefore demanding only five layers, and will last three hundred years (see also p. 172). The hide, accordingly, was cut up in horizontal sec-

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to unite, combine, to assemble," whence the significance "layer, stratum" is doubtless derived; whereas there is no evidence that it was ever understood in the sense of "piece." Couvreur explains it as a numerative of the pieces of an armor, and cites from *Ts'ien Han shu*, "an armor composed of three pieces" (*san shu chi kia*). It is inconceivable that such a device ever existed. It certainly was a hide armor consisting of three layers of skin. A. Conrady (Eine indochinesische Causativ-Denominativ-Bildung, p. 165) has succeeded well in tracing the etymology of the word *shu*. The ancient pronunciation, according to him, was *žuk* (Japanese *šuk*); the primeval form to be supposed is *grog*, identical with the Tibetan root *grog* in *s-grog-pa* ("to tie"), *s-grog* ("rope, strap"), and *grogs* ("fellow, friend"). This derivation also sheds light on the Chinese word *shu* assuming the significance "strip or layer of hide or leather."

[1] It is therefore an anachronism when the passage in the text of the *Chou li* (Giles, No. 4437) is translated, "In coats of mail, it is desirable for the plates to fit evenly." Anything like plates is then out of the question. What is meant in this passage is (and it is so understood by the Chinese commentators) that the hide used in the cuirasses should not wrinkle. Biot very aptly translates, "On la revêt, et on demande qu'il n'y ait pas d'inégalités dans les coutures (qu'elles ne grimacent pas)."

[2] A cuirass of seven thicknesses is mentioned in the biography of I Shên (*T'ang shu*, Ch. 170, p. 2).

tions into large and thin sheets, such as could be weighed and divided into equal parts. It would be unreasonable to infer that a rhinoceros-skin in its natural state of thickness could be properly cured, and then utilized for the making of an armor: the skin was split into strata evenly thick, which were cured, probably boiled, and according to the number required were tightly pressed together. The fact that the harness was not composed of seven, six, and five pieces becomes sufficiently evident also from the rule that the long hide strips were laid around the trunk horizontally;[1] naturally, for this was the most rational and efficient use that could have been made of them. In all probability, the entire affair consisted of only two main parts,— the corselet enveloping the trunk, and the skirt protecting the thighs,—both being closely joined together. Either part could have been made from a single piece of hide. The sewing, of course, refers to the various layers of hide and the seams. How the garment was put on is not indicated in the text; but it seems plausible to infer that it was open in the middle of the front.

By a very similar process, cuirasses were still turned out in northern China and Mongolia in recent times. The American Consul BEDLOE[2] reported on this subject as follows: "The original armor of the north (Manchuria and Mongolia) seems to have been leather, and in shape was more like a blouse than a jerkin. In the course of years the skin was doubled, trebled, and quadrupled, and a Chinese lower garment that might be called leather greaves and cuirasses combined was added to the upper one. The Mongolian nomads learned at an early age that a coat or cuirass made of sheepskin in several thicknesses makes a very warm garment and would turn a spear, arrow, or sword. Apparel of this class is in use to-day and may be bought very cheaply in Shantung." In the same manner the cuirasses of the Mongols invading Europe were wrought. Thomas of Spalato, an historian of the thirteenth century, describes their defensive armor as made of ox-hide, several layers of it being so tightly pressed together that the armor is quite impermeable, and affords considerable protection.[3] This is confirmed by MARCO POLO,[4] who relates that the Mongols wear on their backs armor of cuirbouly, prepared from buffalo and other hides, which is very strong.[1] Japanese accounts of the Mongol attempt to invade Japan allude likewise to the cuirasses of the Mongols.[2]

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[1] BIOT translates with perfect correctness, "On prend leur longueur totale pour faire le contour de la cuirasse."

[2] *Consular Reports on Commerce, Manufactures*, etc., No. 147, p. 494 (Washington, 1892).

[3] G. STRAKOSCH-GROSSMANN, Der Einfall der Mongolen in Mitteleuropa, p. 28 (Innsbruck, 1893). The Tlingit cuirass on Plate XI consists of two superposed layers of elk-hide.

[4] Ed. of YULE and CORDIER, Vol. I, p. 260.

The leather corselets *kia* seem to have been in general use, even at an early date, among the people of the state of Ts'in, who were prepared to don them in case of war, as mentioned in a song of the *Shi king*.[3] Mêng-tse[4] speaks of the strong armor and the sharp weapons of Ts'in and Ch'u. Siün K'ing, a philosopher of the third century B.C., ascribes armor of sharkskin and rhinoceros-hide to the people of Ch'u; both were hard like metal and stone.[5] This is the more remarkable, as the author goes on to say that the people of Ch'u possessed the iron and steel of Yüan, a place corresponding to the modern Nan-yang in Ho-nan Province, and that their lance and arrow heads, apparently of iron or steel, were sharp like the stings of wasps and scorpions. We may therefore infer that the people of Ch'u, despite their acquaintance with iron, had not yet advanced to the stage of iron armor. Their hide armor must have been light in weight; for they are reported to be "light and agile, fiery and swift, and rapid like a hurricane." In general, however, or in other states, these cuirasses seem to have been heavy and uncomfortable; for we hear that they were donned only during battle, but rolled up and carried by the soldiers during the march.[6] They did not allow the wearer to run; and when driven to flight, the soldiers threw them off, trailing their arms behind.[7]

From a text in *Tso chuan*[8] it appears that rhinoceros cuirasses were also varnished with a red lacquer. They are frequently alluded to in that work,[1] and were doubtless the usual means of body protection during the whole Ch'un-ts'iu period (B.C. 722–481). The states drew up schedules of their weapons and defensive armor. In one passage,[2] a distinction is made between soldiers wearing armor lashed with cords (*tsu kia*, No. 11,828) and those who had donned an armor of silken fabrics (*p'i lien*, Nos. 8769, 7151). It is clear only that two kinds of armor are here discriminated, and that their diversity of technique and quality of material brought about a different effect: of the soldiers clad with the former armor, there were three hundred, of whom eighty escaped; of soldiers with the latter armor, there was a force of three thousand, of whom only three hundred escaped. We do not exactly know, however, what these armors really were. LEGGE interprets *tsu kia* as "buff-coats lacquered as if made of strings" (then again translating "the men whose buff-coats looked as if made of strings"), and *p'i lien* as "whose coats were covered with silk." Neither is intelligible. S. COUVREUR[3] has proposed to explain the term *tsu lien* as "cuirasse faite de cordons de soie, et tunique ouatée faite de grosse soie cuite,"[4] and the term *tsu kia* as "cuirasse faite de cordon de soie et enduite de vernis." These definitions are helpful, yet they leave us in the dark as to the contrast between the armor *tsu* and the armor *lien*. The latter, which proved so disastrous to their wearers, may have been made entirely from a coarse silken material; the former, however, as attested by the word *kia*, seem to have consisted essentially of hide, with the addition of silk cords (styled *tsu*), which I am inclined to think refer to the lashings of the hide armor.

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[1] Buffalo-hide came up as a substitute for rhinoceros-hide in the making of armor during the T'ang period (p. 162).

[2] A. Pfizmaier, Die Geschichte der Mongolen-Angriffe auf Japan (*Sitzungsberichte Wiener Akademie*, 1874, p. 151).

[3] Legge, Chinese Classics, Vol. IV, p. 202.

[4] *Ibid.*, Vol. II, p. 135.

[5] This passage is quoted also by Se-ma Ts'ien (Chavannes, Les Mémoires historiques de Se-ma Ts'ien, Vol. III, p. 217). The *Wu pei chi*, an extensive work on military science written under the Ming dynasty by Mao Yüan-i, and published in 1621, comments on this statement of Siün K'ing that sharkskin armor equals rhinoceros-hide armor in hardness, and is therefore styled *shui si* ("water-rhinoceros"), because the shark is produced in the water. Another instance of sharkskin armor occurs in the *T'ung kien kang mu* (quoted in *T'u shu tsi ch'êng*), where it is ascribed to the Mongols. Shagreen seems to have been utilized by the Chinese in olden times, especially in saddlery. The imperial "caparisons made of shagreen" (Chavannes, *l. c.*, p. 214), I believe, are identical with the modern saddles mounted with shagreen. It is used also for mounting the sheaths and handles of knives and swords, even for the decoration of snuff-bottles. A detailed investigation of the subject is contained in H. L. Joly and I. Hogitaro (The Sword Book, pp. 3 *et seq.* of the appendix).

[6] As attested by Sun-tse (see L. Giles, Sun Tzŭ on the Art of War, p. 58, London, 1910). The case in which the rolled-up cuirass was enclosed was styled *kao* (No. 5949).

[7] As is evident from a passage of Mêng-tse (Legge, Chinese Classics, Vol. II, p. 130).

[8] Legge, Chinese Classics, Vol. V, p. 290.

A special protective contrivance employed by the archers was an arm-guard, called *han* (No. 3799), a leather cuff wrapped around the left arm, the bow being supported against it.[5] From the Han period these objects were made of iron.

The utilization of rhinoceros-hide for armor persisted down to the T'ang period. Li Wang of the Han makes mention of this material (*si se*) for that purpose. A helmet of rhinoceros-hide is mentioned under the year 30 A.D. in the *Tung kuan Han ki*, completed about 170 A.D. In the biography of General Ma Lung,[6] who died in 300 A.D.,[7] we hear of a singular stratagem, in which iron mail (*t'ie k'ai*) versus rhinoceros-hide cuirasses (*si kia*) was at stake. Ma Lung defeated a hostile army by covering the sides of a narrow pass with loadstone,[1] so that the iron-clad enemies were unable to move, whereas his cuirassed men got the better of them. Whatever the basis of this anecdote may be, we recognize that hide armor still held its ground in the age of iron armor, and insured mobility of troops to such a degree that hide-clad soldiers could carry a victory over a heavy-mailed force struggling along under the burden of metal. In some other passages of *Tsin shu* and *Sung shu* we meet the term *si p'i k'ai* ("rhinoceros-hide metal armor"), which must have been a suit with a hide foundation reinforced by metal laminæ. We shall hear more of cuirasses in later periods, and likewise of metal armor.

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[1] *Ibid.*, pp. 289, 397, 419, 517.

[2] Duke Siang, third year (LEGGE, p. 419).

[3] Dictionnaire chinois-français, pp. 494, 982.

[4] In *Li ki*, garments of coarse boiled silk worn after the first year of mourning are mentioned.

[5] COUVREUR, Li ki, Vol. I, p. 621.

[6] Inserted in the Annals of the Tsin Dynasty (*Tsin shu*, Ch. 57, p. 2 b).

[7] GILES, Biographical Dictionary, p. 568.

The hide armor of the Chou is irretrievably lost, and there is little or no chance that any will ever come to light. To a certain degree, hide armor, as still manufactured not so long ago by native tribes of America, may serve as an object-lesson and substitute, and assist us in reconstructing in our minds the appearance of the ancient Chinese warriors. As the course of our investigation renders it necessary to touch also the subject of American defensive armor, these illustrations of American specimens not easily accessible will be welcome to many students. Plate XI illustrates an armor, in the form of a vest, made from extremely hard, heavy, tanned moose-skin of two thicknesses, the two layers being tightly pressed together. It is proof, against musket-balls fired at a reasonable distance. It opens in front, and is closed by means of three iron buckles of foreign make. The specimen comes from the Tlingit, Alaska.[2]

The armor figured in Plate XII is the work of Asiatic Eskimo from East Cape on the Chukotsk Peninsula. It is of particular interest in this connection as exhibiting the tendency toward making a cuirass of a single large piece of hide, as far as possible, thus avoiding the cutting of it. Extending in its total width to fully 1.55 m, two complete skins of seals are utilized in this specimen, the one forming the exterior, the other the interior, of the suit. They are sewed together along the edges with bands of seal-thongs, and enclose between them wooden slats. The central piece protecting the chest has incased in it a board of the same shape and size, while the gradually narrowing flaps have each four slats inserted to secure greater elasticity of movement.

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[1] Regarding the loadstone in China see J. KLAPROTH (Lettre sur l'invention de la boussole, pp. 66 *et seq.*, Paris, 1834), and F. DE MÉLY (Les lapidaires chinois, p. 106).

[2] Similar coats of hardened hide were turned out by the Haida, Chinuk, Hupa, Shoshoni, Navajo, Pawni, Mohawk, and others. There are in the Field Museum several other Tlingit cuirasses painted with the totemic emblems of the clans to which the chiefs wearing them belonged. The shields of the Plains Indians were made from buffalo-hide, with one or two covers of soft dressed buffalo, elk, or deer skin; the hide used for the purpose was taken from the neck of the buffalo bull, and was made exceptionally thick and tough by shrinking it, while wet, over a fire built in a hole in the ground (J. MOONEY, in *Handbook of American Indians*, Vol. II, p. 547).

On Plate XIII is illustrated an armor of hard tanned caribou-skin, of especial interest to students of China because it is covered all over with Chinese coins. It is of the same type of cuirass as the one in Plate XI and comes from the Tlingit, Tarku Tribe, on the Tarku River, Alaska. It was obtained by Lieutenant G. T. Emmons, who says that "the Chinese money was procured in trade from the early Russians, whose ships, exchanging the furs of the North Pacific with the Chinese for tea, plied constantly between the two countries, by which means many Chinese articles found their way to this coast." The coins (about a thousand in number) are arranged in regular vertical rows, and are fastened to the surface of the skin coat by means of leather strips, which pass through their square perforations. The coins are all carefully selected, and only well preserved specimens have been used. The obverse, containing the Chinese legend, is usually on the outside; only in a few cases does the reverse with the Manchu legend stand out. The bulk of these coins date from the beginning of the Manchu dynasty, and are those inscribed with the periods Shun-chi (1644–1661), K'ang-hi (1662-1722), and Yung-chêng (1723-1735). There are several coins of the period K'ien-lung (1736–1795) in this lot, but they form the minority, while the K'ang-hi coins outnumber all others. There is no coin later than the K'ien-lung period, so that it may well be supposed that this collection of coins was traded off in Alaska during or shortly after that period, say roughly at the end of the eighteenth century. We know, of course, that until a few years ago coins of the said description were still circulating in many parts of the interior of China, particularly in the country, though I understand that they have now been withdrawn from currency owing to the financial and monetary reform; it is not likely, however, that such a large number of those older coins would have arrived in Alaska in recent times without any additional modern coins. The conspicuous absence of any coins of the nineteenth century in a lot of a thousand speaks in favor of the assumption that they had been traded at the termination of the eighteenth century. A closer attempt at dating could be made, if it were possible to take off all the K'ien-lung coins, in order to read their reverses, which usually impart the place of the mint, and in some cases would allow of the establishment of a fixed year for the coinage. The last year thus determined would yield the *terminus a quo;* that is, the approximate date, after which this money may have left China *en route* to the north-east. It is not feasible to detach the coins from the armor, nor to lift them sufficiently to enable one to read the reverse, as they are fastened very tightly. Certainly, I do not mean to say that the armor itself originated at the end of the eighteenth century, though of course this might be possible; while it is conceivable also that the coins, on arrival in Alaska, were kept in a family; or bequeathed to some member of it, and were attached to the cuirass at a much later date.[1]

It is curious that in the *Chou li* no mention is made of helmets. A reference to them was presumably contained in the lost chapter *Se kia*, "the Superintendents of Armor," an office dealing with the business of defensive and offensive armor. In the *Shi king*, in one of the songs of the country of Lu, helmets adorned with shells (*pei chou*) are mentioned. The shells, as is explained by the commentaries, were connected, and attached to the helmets by means of strings of vermilion color.[2] The helmets were nothing but round leather caps, corresponding to the *galea* of the Romans.

Armor and helmet were designed to create the impression of strength and bravery, and to inspire such fear that the enemy did not dare to attack the wearer.[3] They were considered valuable objects and were presented as gifts.[4]

The regular force which a great state could at the utmost bring into the field consisted of a thousand chariots.[5] Each chariot contained three armored men,— the charioteer in the middle, with a spearman on his right, and an archer on his left. There were attached to it seventy-two foot-soldiers and twenty-five other followers, one hundred men in all; so that the whole force would amount to a hundred thousand men. But in actual service, the force of a great state was restricted to three armies, or three hundred and seventy-five chariots, attended, inclusive of their armored occupants, by thirty-seven thousand five hundred men, of whom twenty-seven thousand five hundred were foot-soldiers.[1] It seems that body armor was restricted to those fighting from the chariots. Another safeguard of the warriors was formed by shields decorated with figures of dragons, or perhaps adorned with feathers.[2] The latter affair presents a point of controversy among the commentators: the one understanding that the feathers were fixed to the shield; the others, that they were painted on it. LEGGE adopts the latter view, and translates, "the beautiful feather-figured shield." Also COUVREUR is inclined to think that feathers of different kinds were represented on the shield. This opinion, however, is not very convincing. Whereas it is perfectly plausible that designs of dragons, or, as in recent times, of tigers were painted on the shields, and doubtless intended to guard the wearer and to terrify the enemy, it is difficult to see what reasons could induce man to decorate his shield with a pictorial pattern of feathers. We are all familiar with the shields of primitive man adorned with real feathers, particularly among the American Indians; and the primitive man of the *Shi king* period, in all likelihood, may have done the same.[3] A document of the Han period brought to light by M. CHAVANNES (see p. 189), in which pigeon tail-feathers are mentioned in connection with a buckler, is very apt to corroborate this conclusion.

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[1] F. RATZEL (Über die Stäbchenpanzer, *Sitzungsberichte der bayerischen Akademie*, 1886, p. 191), who mentions such coin armor among the Tlingit, derives it from the idea of armor-scales, and remarks that motives of protection and decoration here come into close contact with each other. The idea of a scale armor, however, is excluded in such specimens as the one figured by HOUGH (Primitive American Armor, Plate XXI, Fig. 1) where the coins are strung loosely and at some distance from one another, so that protection from them, if any at all, could only amount to a minimum. Further, the conspicuous absence of scale armor on the entire continent of America conflicts with the view that the comparatively recent coin armor might be the imitation of scale armor. The coins have a merely ornamental purpose, and possibly also the function of amulets or magic protection; as such, these two ideas being combined, we find Chinese coins sewed on to every-day garments among the Gold and the Gilyak on the Amur; and as the common Chinese people are themselves in the habit of wearing old coins as charms, it seems very plausible that the example of the Chinese may have served as an incentive to the Amur tribes, and that Russian traders, familiar with the customs of Siberian peoples, may have suggested the same practice to the tribes of Alaska.

[2] LEGGE, Chinese Classics, Vol. IV, p. 626.

[3] *Li ki*, ed. COUVREUR, Vol. I, p. 52; Vol. II, p. 492.

[4] *Ibid.*, Vol. I, p. 41; Vol. II, pp. 17, 18.

[5] The war-chariot is generally believed to have arisen in Babylonia, and to have spread from this centre to Egypt, Greece, Iran, and India. But the great antiquity which the war-chariot may claim in China prevents us from accepting the conclusion that it was plainly derived there from Babylonia in historical times. Like many other basic factors of ancient Chinese culture, it ranges in the class of those acquisitions which ancient China has in common with western Asia, and which go back to a remote prehistoric age. To these belong the mode of agriculture, the cultivation of

The shield was combined with the spear,[4] while later in the Han pe-

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wheat and barley, tilling of the field by means of the plough drawn by an ox, methods of artificial irrigation, cattle-breeding, employment of cattle as draught-animals, the composite bow, the cart based on the principle of the wheel, and the potter's wheel.

[1] LEGGE, Chinese Classics, Vol. IV, p. 626; COUVREUR, Cheu King, p. 137. I have abandoned Legge's inexact word "mailed" and substituted "armored" for it; anything like "mail" was unknown in China during the archaic period (compare Chapter IV).

[2] LEGGE, *l. c.*, p. 194; COUVREUR, *l. c.*, pp. 135, 136.

[3] The Tibetans had bucklers ornamented with feathers (see p. 256). An unsophisticated mind may certainly be entitled to raise the question how the Chinese commentators get at the "feathers" in the passage of the *Shi king*, as no direct word to this effect is employed. The word *mêng* (No. 7763), into which this meaning is read, means "to cover, to envelop;" and the term *mêng fa*, after all, may simply mean "wooden shields covered with hide." In this sense, the term *mêng tun* ("hide-covered buckler") is indeed utilized in later literature.

[4] For instance, BIOT, Chou li, Vol II, p. 223. In the inscriptions on ancient bronzes, as reproduced and explained in the *Po ku t'u lu*, the word *sun* ("grand-

riod it was handled together with the sword. The term *kan ko* ("shield and spear") in the *Shi king*[1] is a collective notion comprising defensive and offensive armor, or war-implements. In the administration of the Chou dynasty, there was a special official presiding over the various kinds of spears and bucklers, and commissioned with their distribution.[2] But no contemporaneous description of shields is handed down, from which an exact conception as to their material and form might be gained.

The shields protecting the soldiers in the war-chariots were presumably roof-shaped, as we glean from a text in *Tso chuan*[3] when, in the battle of Ch'ui-pi, fought between the armies of the principalities of Lu and Ts'i, Tse-yüan Tsi of Ts'i pursued Shêng-tse, and shot an arrow at him, hitting the ridge of his shield. In this passage the ridge is designated "roofing-tile" (*wa*), explained by the commentary as the ridge of the shield. This is also the earliest document in which the word ***shun*** (No. 10,154) appears as a designation for the shield, and, owing to its composition with the classifier 'wood,' leaves no doubt that the shields were wooden.[4] It is worthy of note that during the early period, in the same manner as in armor, no metal was employed for the bucklers; and it is remarkable also that in all later periods of culture when the working of metals was in full swing, none were ever turned to that purpose; wood, rattan, and hide holding their place. The buckler, accordingly, never assumed a vast importance in Chinese warfare.[5]

A fundamental text relating to ancient shields, though dating from the time of the Later Han dynasty, is contained in the dictionary *Shi ming* by Liu Hi. He defines the word ***tun*** ("shield") as ***tung*** ("to

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son") is represented in writing by the rough figure of a youth holding spear and shield, and performing a war-dance.

[1] LEGGE, Chinese Classics, Vol. IV, pp. 484, 578. Likewise in *Li ki* (ed. COUVREUR, Vol. I, pp. 233, 468).

[2] BIOT, Chou li, Vol. II, p. 238; J. H. PLATH, Das Kriegswesen der alten Chinesen (*Sitzungsberichte der bayerischen Akademie*, 1873, p. 33).

[3] Duke Chao, 26th year, B.C. 516 (compare LEGGE, Chinese Classics, Vol. V, p. 716).

[4] *Shi king*, *Chou li*, and *Shi ki* use the word ***tun*** (No. 12,223), which is doubtless derived from the verb ***tun*** (No. 12,225), "to hide away, to conceal one's self." The word ***kan*** (No. 5814) appears twice in *Shu king*. The commentaries do not interpret the differences between the three words, but explain one by another. The shield, as elsewhere, was occasionally applied also as an offensive weapon. Thus, Fan K'uai, girt with a sword and bearing the buckler on his arm, penetrated into the camp of Hiang Yü, and used the buckler in pushing the guards down, who thus fell to the ground (CHAVANNES, Les Mémoires historiques de Se-ma Ts'ien, Vol. II, p. 279).

[5] Copper shields are mentioned by the Chinese, but refer to foreign tribes; for instance, in the Annals of the Yüan Dynasty under the year 1286, when they were sent from a foreign country called Ma-pa; they are ascribed also to the Shan of Yünnan (see p. 193).

conceal one's self," No. 12,241), and as the object behind which a man hides himself in a kneeling position in order to evade an attack. Liu Hi enumerates two kinds of foreign shields adopted by the ancient Chinese, — a large and flat one, which originally was indigenous to the country of Wu[1] and peculiar to the generals there, hence styled *Wu k'uei* (No. 6499), "general of Wu;" and a high one, termed *sü tun,*[2] coming from the country of Shu (Sze-ch'uan), but termed by others "shield of the K'iang (Tibetans)" because they asserted that it originated from the K'iang. Here we notice the ever-recurring Chinese tendency toward imitating and appropriating the armaments of the neighboring tribes. Liu Hi mentions also the long and narrow shields used by the infantry soldiers in combination with the sword,— styled "foot shields" (*pu* [No. 9485] *tun*);[3] and the short and narrow shields employed on the war-chariots,— styled "small shields" (*kie* [No. 1505][4] *tun*). As to the materials chosen for their manufacture, he emphasizes boards and, what is of especial interest, rhinoceros-hide (*si p'i*). The latter were termed "rhinoceros shields" (*si tun*); the former, "wooden shields" (*mu tun*). The specimen of a circular buckler of rhinoceros-hide, of Indian manufacture (secured by the writer in Tibet), is illustrated in Plate XXVII.

Culture-objects when once acquired survive through the ages with persistent force, even after the introduction of innovations which seem to be apt to supersede entirely the old material. We have already referred to the fact that cuirasses have not yet wholly disappeared in modern China. Indeed, we meet them in all periods of Chinese history, despite new inventions of superior quality.

From the wooden documents found in Turkistan, and recently deciphered with admirable ingenuity by E. CHAVANNES[5] it becomes apparent that hide corselets formed the defensive armor of the Chinese soldiers serving in eastern Turkistan during the Han period. The contemporaneous texts written out on wooden slips employ either the plain word *kia* (No. 187), or the compound *ko kia* (Nos. 393, 569), "hide armor;" and we hear also of an official having charge of armor (No. 758).[1] Simultaneously, another word for body armor, *k'ai*, is twice used in these documents (Nos. 758, 794), and translated by M. CHAVANNES likewise "cuirasse." This seems to be correct only in so far as leather was applied also to this kind of armor, as expressly attested by document No. 794; but it will be seen in the following chapter that the new word *k'ai*, which springs up in the Han period, denotes a new type of armor presenting a combination of hide with metal, and that the rendering by "cuirass" is therefore inadequate. The defensive armor of the Han soldiers was completed by a helmet (No. 794) and a buckler (*tun*), the latter being described as red in the wooden documents (Nos. 75, 77), from which it may be inferred that they were made of wood covered with a red varnish[2] protecting the wood from moisture, red being believed to terrify the enemy; it was the main function of the buckler to ward off the shots of arrows (No. 682). In one case a buckler is especially mentioned as having been made in B.C. 63 by the official Armory of Nan-yang in Ho-nan Province (No. 39); in another case a buckler is on record as having been worked in B.C. 61 by the artisans of the administration (No. 40). Bucklers were decorated with pigeon tail-feathers attached to them (No. 75).[3]

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[1] No. 12,748. Wu is an ancient kingdom comprising the present province of Kiang-su, the southern part of An-hui, and the northern portions of Chê-kiang and Kiang-si (see Chinese Pottery in the Philippines, p. 42, note 10).

[2] *Sü* (No. 4716) is explained as a war-implement in K'ang-hi's Dictionary, which quotes the passage in question. This interpretation is not quite satisfactory; for the word *sü* must have a more specific meaning, as shown by the parallelism of the preceding sentence and the following clause, in which it is said that these shields were handled by the *Sü* of the country of Shu. The word, accordingly, parallel to the preceding generals of Wu, must refer to a military charge or rank in Shu; and it is doubtless derived from a language spoken in Shu, or from a language of the K'iang.

[3] These were actually used in the Han period, as will be noticed in Chapter III.

[4] The word is explained by him in the sense of "small."

[5] Les documents chinois découverts par Aurel Stein dans les sables du Turkestan oriental, p. XVI (Oxford, 1913).

Despite the fact that metal armor, as will be seen in the next chapter, gradually made its way during the period of the two Han dynasties, and was firmly established in the age of the T'ang, mention is still made in the Statutes of the T'ang Dynasty[4] of hide cuirasses (*p'i kia*); rhinoceros-hide (*si se*) being employed for them, and sometimes being supplanted by buffalo-hide.

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[1] In Ch. 49 of *Hou Han shu* the story is told of how in 75 A.D. General Kêng Kung and his troops, being at war with Kucha, were at the point of starvation, and cooked cuirasses and crossbows so as to feed on the leather and sinews contained in them (CHAVANNES, *T'oung Pao*, 1907, p. 228), — a case sufficiently convincing as to the material of which they were made.

[2] In the same manner as the cuirasses (p. 182).

[3] M. CHAVANNES (*l. c.*, p. 30) thinks that the expression "pigeon-tail" must be a technical term which designates perhaps the leather or hemp handle of the buckler. There is in my opinion no necessity for such a conjecture. "Pigeon-tail," I venture to suggest, is to be understood literally, inasmuch as the buckler, as perhaps in the period of the *Shi king*, was adorned along its edges with feathers; in the document in question the report is made that the soldier so and so has received "a red buckler, the pigeon tail-feathers of which had rotted away." The "rotting-away" sounds plausible with regard to the latter, but much less so if a leather or hemp strap were intended. As to offensive armor, M. CHAVANNES correctly emphasizes the fact that the Chinese soldiers of the Han time availed themselves of crossbows, not of bows; this is confirmed by his documents as well as by the Han sculptures, on which men are usually represented as shooting with crossbows, not, as has been said by some observers, with bows. As to swords, it seems preferable to study them from actual specimens of cast bronze and iron, such as are in our collections, instead of from the bas-reliefs, as M. CHAVANNES recommends us to do (compare Plates XX and XXI).

[4] *P'ei wên yün fu* (Ch. 106, p. 73), and *Ko chi king yüan* (Ch. 41, p. 3). The *T'ang leu tien* ("Six Statutes of the T'ang Dynasty") gives a description of the

In the History of the Liao Dynasty[1] rhinoceros-hide armor is still recorded for the year 952 as a tribute of the Nan T'ang dynasty to the Court of the Liao. The captains in the army of the kingdom of Nan-chao are reported to have used cuirasses made from rhinoceros-hide.[2] During the middle ages, when the rhinoceros grew scarcer, other hides began to take its place. It has been demonstrated above (p. 162) that under the T'ang the district of Kuang-ling sent to the Court tribute of buffalo-hide armor.[3] MARCO POLO[4] says regarding the Mongols that on their backs they wear armor of cuirbouly (boiled leather), prepared from buffalo and other hides, which is very strong; and all contemporary western writers speak of the leather armor used by the Mongols.[5] This fact is confirmed by the Annals of the Yüan Dynasty.[6]

The type of cuirass styled "hoop armor" has possibly at one time existed in China, though there is no description of it. At the Court of the emperors of the Kin dynasty (1115–1234) in Peking, the guards were all clad with armor. On the left were stationed those with a banded cuirass colored blue (*ts'ing t'ao kia*), holding in their hands a flag on which was represented a yellow dragon. On the right were stationed those with a banded cuirass colored red (*hung t'ao kia*), holding a flag with a red dragon represented on it.[7] The word *kia* used in this connection indicates that it is the question of hide cuirass; and the word *t'ao* ("band") defines the peculiar character of this armor in that it was banded or hooped, the bands being cut out of leather, perhaps in a

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administrative organization of the period K'ai-yüan (713–741) of the T'ang dynasty, the authorship being ascribed to the Emperor Yüan-tsung (713–755), and Li Lin-fu and others contributing to the interpretation of the work (WYLIE, Notes on Chinese Literature, p. 67; PELLIOT, *Bulletin de l'Ecole française d'Extrême-Orient*, Vol. III, 1903, p. 668).

[1] *Liao shi*, Ch. 6, p. 1.

[2] C. SAINSON, Histoire particulière du Nan-Tchao, p. 19 (Paris, 1904).

[3] In *Yen kien lei han* (Ch. 228, p. 14) a book *Ts'e lin hai ts'o* is quoted to the effect that what is designated "rhinoceros-hide armor" in the T'ang History is at present made from buffalo-hide, but is generally styled *si* ("rhinoceros").

[4] Ed. of YULE and CORDIER, Vol. I, p. 260.

[5] W. W. ROCKHILL, The Journey of William of Rubruck, p. 261 (London, *Hakluyt Society*, 1900), and p. 180.

[6] For instance, *Yüan shi*, Ch. 78, p. 12 (K'ien-lung edition).

[7] This information is contained in the *Pei yüan lu*, the narrative of a journey in 1177 A.D. from Hang chou to Peking, described by CHOU SHAN and translated by CHAVANNES (*T'oung Pao*, 1904, pp. 163–192; the passage indicated is on p. 189). It is quoted, though incompletely, in *P'ei wên yün fu* (Ch. 106, p. 74). CHAVANNES' translation "cuirasses avec des cordons bleus" certainly is all right, as far as the translation is concerned; but I am inclined to think that this term is capable of the interpretation as given above. The word *t'ao* ("band") is in GILES, No. 10,817.

manner similar to that of the corresponding Chukchi armor figured and described by WALTER HOUGH[1] and W. BOGORAS.[2]

Another singular kind of armor is alluded to in the *Lan p'ei lu*[3] under the name *jung kia*. The word *jung* (No. 5736) refers to the soft core of the young antlers of the deer (considered by the Chinese an efficient aphrodisiac); and I am inclined to interpret the term *jung kia* as a cuirass strengthened by horn shavings fastened to the surface, for which there are interesting analogies in other culture areas.[4] In the passage referred to it is said that in the east and west galleries of the imperial palace the guards were clothed with armor, and that those posted east wore armor of horn dyed red (*hung jung kia*), those posted west wore armor of horn dyed green and blue (*pi* [No. 9009] *jung kia*). It thus seems that the Kin or Niüchi had a predilection for curious armor.

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[1] Primitive American Armor (*Report of the U. S. National Museum for 1893*, Plate IV and p. 634). An excellent specimen of this type is in the Field Museum (Cat. No. 34,151).

[2] *Publications du Musée d'Ethnographie et d'Anthropologie de St. Pétersbourg*, II, Plate XII, Fig. 1 (St. Petersburg, 1901). The Chukchi hoop armor, however, is not related to the so-called banded mail of the European middle ages, as asserted by HOUGH (*l. c.*, p. 633) and repeated by BOGORAS (The Chukchee, *Jesup North Pacific Expedition*, Vol. VII, p. 162). In the European types it has been shown that the banded appearance, as it occurs in mediæval illustrations, was produced by thongs of leather which were strung through adjacent rows of chain-links (BASHFORD DEAN, Catalogue of European Arms and Armor, p. 22, New York, 1905),— a feature entirely lacking in the Chukchi armor.

[3] Quoted in *P'ei wên yün fu*, Ch. 106, p. 74. This is a brief work containing likewise the narrative of a mission to the Court of the Kin emperors in 1170 by Fan Ch'êng-ta (1126–1193), and reprinted in *Chi pu tsu chai ts'ung shu*. In the text of this work it is added that the guards had spears with handles inlaid with gold leaf, and flags painted with blue dragons; those in the east had yellow flags, and those in the west white ones.

[4] AMMIANUS MARCELLINUS (XVII, 12) narrates that the armor of the Quadians and Sarmatians consisted of small scales of polished horn arranged on a linen coat like the plumage of a bird (loricae ex cornibus rasis et levigatis, plumarum specie linteis indumentis innexae); and PAUSANIAS (I, 21, 5) relates that a Sarmatian scale armor made of horses' hoofs was preserved as a curiosity in the Temple of Aesculapius at Athens. RATZEL (Über die Stäbchenpanzer und ihre Verbreitung im nordpazifischen Gebiet, *Sitzungsberichte der Bayerischen Akademie der Wissenschaften*, 1886, p. 191) mentions, after a letter received from William H. Dall, an armor made by the Tlingit from slices of deer-hoof fastened to a foundation of elk-skin in the manner of scale armor. In the Philippine collection of the Field Museum (Cat. No. 34,493, gift of Mr. E. E. Ayer), there is a suit of armor composed of rectangular laminæ of buffalo (carabao) horn, mutually connected by means of rows of brass rings. This armor was made by the Moro on Basilan Island. It is identical with the specimen figured by L. SCHERMAN (Berichte des K. Ethnographischen Museums in München IV, 1911, *Münchner Jahrbuch der bildenden Kunst*, 1912, p. 96, Fig. 18), which is stated to hail from the Sulu Archipelago, and to be characteristic of this region. In the Field Museum, however, there is also a suit of armor of exactly the same type, in which the laminæ are entirely wrought from brass, and likewise joined by means of brass rings. This metal suit, according to the traditions of the natives, was captured in 1631 when a Spanish expedition was massacred at Lake Lanao; they assure us also that the suits of carabao horn were turned out in imitation of this Spanish model. It is therefore obvious that the metal harness in question, as moreover attested by the evidence of the object itself, is of Spanish make, and served as model for the Philippine as well as the Sulu horn armors. Suits of armor have always been highly prized articles and carried away to remote corners by barter or capture in war; and it is always necessary to be on one's guard in making correct attributions. We may even go so far as to say that it would be impossible for the natives of the Philippines to construct such a complicated affair from their own inventiveness. Their purely native armor is unpretentious, being made from woven hemp stuffed with matted hemp fibre. This is the national North-Malayan type of body armor, the same as

Reference to the cuirass of the Mongols has already been made above (pp. 180, 190).

"They ride long like Frenchmen, and wear armor of boiled leather, and shields and arblasts, and all their quarrels are poisoned,"— thus MARCO POLO[1] describes the equipment of the inhabitants of the kingdom of Nan-chao in Yün-nan called by him Carajan. Yule is inclined to prefer the reading "cuir de bufal" offered by another text, as some of the Miao-tse of Kuei-chou are described as wearing armor of buffalo-leather[2] overlaid with iron plates.

Hide was indeed the chief material utilized for body armor by the aboriginal tribes inhabiting southern China. In this respect we are well informed by several reliable and observant authors of the Sung period. The famous Fan Ch'êng-ta (1126–1193),[3] official, poet, florist, traveller, and ethnographer, has the following description in his valuable account of the regions of southern China,[4] "As regards the armor of the *Man* tribes, harness and helmets are wrought to a large extent only in the kingdom of Ta-li.[5] Elephant-skin is used for this purpose in such

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we find on Formosa. The aborigines of Formosa, at the time when the Chinese made their first acquaintance in the beginning of the seventh century, were in a transitional stage of life, iron being only sparsely used, while bone and horn took its place; and a hoe with stone blade was employed in tilling the fields. The interesting account given in the Annals of the Sui Dynasty (*Sui shu*, Ch. 81, p. 5) ascribes to them knives, spears, bows and arrows, swords and daggers; and adds that owing to the scarcity of iron in the country the blades are thin and small, being replaced to a great extent by bone and horn, and that "of plaited hemp they make armor, or avail themselves of bear and leopard skins."

[1] Ed. of YULE and CORDIER, Vol. II, p. 78.

[2] According to the *Nan-chao ye shi*, as previously shown, it was rhinoceros-hide; while the text of Fan Ch'êng-ta which follows above speaks of elephant-skin. In all likelihood these three materials, buffalo, rhinoceros, and elephant, were used side by side.

[3] GILES, Biographical Dictionary, p. 242.

[4] The general title of the work is *Kui hai yü hêng chi* (WYLIE, Notes on Chinese Literature, p. 56; BRETSCHNEIDER, Botanicon Sinicum, pt. 1, p. 165). The single chapters have separate headings; the one from which the above extract is given is entitled *Kui hai k'i chi* ("Records of Implements in Southern China"). My quotation refers to the reprint of the text in *T'ang Sung ts'ung shu*.

[5] Name of the country and the capital of the Shan in the present province of Yün-nan, who ruled as the Nan-chao dynasty, and whose kingdom was destroyed by the Mongols in 1252. It still was independent at the time to which our above account refers. The fact that the armor of the *Man* is traced to the kingdom of Ta-li, then inhabited by the *T'ai* or *Shan*, is of some significance. The *T'ai* were a warlike and chivalrous nation like the Tibetans, and had developed a highly advanced culture

a manner that one large piece covers the breast and another the back, looking like the carapace of a turtle, and being as solid and massive as iron.[1] Then small strips of leather are so combined as to form brassards and nape-guards, made like the iron armor-plates of the Chinese,[2] and all colored vermilion. Helmet and harness, both on the interior and exterior side, are all colored vermilion. By means of yellow and black mineral dye-stuffs they paint designs of flowers, small and large animals, such as are now found on girdle-buckles,[3] — of admirable workmanship. They string also small white shells[4] in connected rows, sew them on to the harness, and decorate the helmets with them. Presumably they are survivals of those ancient helmets adorned with shells on vermilion strings mentioned in the *Shi king*."[5]

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betraying, in opposition to the Chinese, a keynote of striking individualism. Every adult was a soldier; and it is a surprising fact that there was compulsory military service in the kingdom of Nan-chao, and that the army was highly organized. The History of Nan-chao compiled in 1550 by YANG SHĔN (1488–1559) narrates that the army captains used to wear cuisses, red helmets, and cuirasses of rhinoceros-hide, and carried bucklers of copper; but they marched bare-footed (C. SAINSON, Histoire particulière du Nan-Tchao, p. 19, Paris, 1904). As to its historical relations, the protective armor of the *Man* must therefore be connected with that of the *Shan;* and the *Man* apparently derived it from the superior culture of their neighbors.

[1] Virūdhaka, one of the four guardians of the world (*lokapāla*) in Hindu mythology, wears a helmet from the skin of an elephant's head (GRÜNWEDEL, Buddhist Art in India, p. 138, and Mythologie des Buddhismus, p. 181). An armor of elephant-skin overlaid with gold in the possession of a Mongol prince in 1573 is mentioned by Sanang Setsen (I. J. SCHMIDT, Geschichte der Ost-Mongolen, p. 217). The Jesuit Francisco Combes, in his Historia de Mindanao of 1667 (BLAIR and ROBERTSON, The Philippine Islands, Vol. XL, p. 179), reports that the Joloans on Mindanao in the Philippines are armed from top to toe with helmet, bracelets, coat-of-mail, greaves, with linings of elephant-hide armor so proof that nothing can make a dint on it except fire-arms, for the best sword or cutlass is turned. As the elephant does not occur in the Philippines (its presence on Borneo is presumably due to human agency), these armors, in all likelihood, must have been importations from the Asiatic mainland.

[2] See Chapter V.

[3] The word employed here is *si-pi* (No. 9050), which in this mode of writing, for the first time, appears in Se-ma Ts'ien's *Shi ki* (Ch. 110, p. 6 b) in the sense of a buckle to fasten a girdle. E. H. PARKER (*China Review*, Vol. XX, p. 15), in his translation of this passage, explains *si-pi* as a word of the Sien-pi language. See now R. and H. TORII, Études archéologiques (*Journal of the College of Science*, Vol. 36, Tōkyō, 1914, p. 82, and Plate XII). The same word is used again by our author in the description of the swords made in Ta-li; the sheaths are colored vermilion, and painted in their upper part with a design like those occurring on buckles (*si pi hua wĕn*). Similarly it is employed in the *Ling-wai tai ta* (published by Chou K'ü-fei in 1178) in the description of the saddles of the *Man* (Ch. 6, p. 5), which are varnished red and black like the designs on buckles (*ju si pi wĕn*). This term is not registered in the *P'ei wĕn yün fu.*

[4] The *Ling-wai tai ta* (Ch. 7, p. 9), composed by Chou K'ü-fei in 1178, informs us that the shells utilized in the kingdom of Ta-li for the decoration of armor and helmets came from the island of Hainan; they are called "large shells" (*ta pei*), in the works on natural history "purple shells" (*ts'e pei*). They are described as being round on the back, with purple flecks, and with deep cracks on the surface.

[5] See above, p. 185. Such combinations are suggested to the learned Chinese authors by their literary education, but certainly are no evidence for the shell decorations of the *Man* being really due to a stimulus received from ancient China. The

As to the *Li*, the inhabitants of the island of Hainan, the same author states that they make helmets of plaited rattan.

A cuirass of the Lolo is figured and described by F. STARR.[1] It is composed of heavy, moulded plates of thick leather, varnished black and decorated in red and yellow, the shoulders being protected by two projecting wings. From this plastron is suspended an apron of seven horizontal rows of scales, each row overlapping the one above it, and the scales in each row overlapping. The mode of wear of this armor may be seen in the portrait of the Lolo chief Ma-tu figured by CH. FRANÇOIS,[2] who states that these cuirasses are made of buffalo-skin painted with various colors, somewhat similar in shape to the ancient Japanese armor.[3]

Two specimens of Lolo armor are described by HERBERT MUELLER,[4] which are of the same type as the one figured by Starr, only that those have the central breastplate, which is apparently lost in the latter specimen. Neither Starr nor Mueller has recognized what type of armor is here represented. It is not armor of a uniform structure, but one in which two principles are combined, that of sheets, and that of plates or laminæ. The sheets form the body armor proper, ten in number,

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employment of shells for decorative purposes, on the contrary, is a general characteristic of all cultures in south-eastern Asia and Tibet, where they are employed in a manner foreign to the Chinese. The Tibetan women use large shells as bracelets, and wear girdles, to which rows of shells are attached. It is surprising to find these in the high mountainous regions of Sze-ch'uan (for instance, in Romi-Drango), in isolated spots remote from the sea, whither these shells must have been brought from India via Tibet, or from Burma by way of Yün-nan. The women of the P'u-jên, a tribe of the T'ai or Shan stock formerly inhabiting Yün-nan, used to wear a short skirt, to which ten rows of marine shells were fastened all round (C. SAINSON, Histoire particulière du Nan-Tchao, p. 164). The women of the White Kuo-lo or Lo-lo covered their heads with black cloth adorned with shells (*ibid.*, p. 167); compare also pp. 170, 175, 179, 185, in regard to other tribes who observed the same practice. An interesting study of the Indian shell industry was recently published by J. HORNELL (The Chank Bangle Industry, *Memoirs As. Soc. Bengal*, Vol. III, pp. 407–448, Calcutta, 1913).

[1] Lolo Objects in the Public Museum, Milwaukee (*Bulletin of the Public Museum of the City of Milwaukee*, Vol. I, 1911, p. 216 and Plate III, 8).

[2] Notes sur les Lo-lo du Kien-tchang (*Bulletin de la Société d'Anthropologie*, 1904, p. 640).

[3] The correctness of this comparison seems to me doubtful. PLAYFAIR (*China Review*, Vol. V, p. 93) has drawn from a modern Chinese source the following notes on armor among the Kiu-ku Miao: "The crown of the head is protected by an iron helmet which leaves the back of the head exposed. On the shoulders they wear two pieces of hammered iron armor, of considerable weight, which act as a face-guard. Their body armor covers the whole of the back and the chest. In addition they wear iron chain mail covering the entire body and weighing about thirty catties; they have the appearance of being enclosed in a cage. Their legs are cased in iron greaves of great strength. They carry in their left hand a wooden shield, in their right a sharp-edged spear." Chain mail is discussed in Chapter IV.

[4] *Baessler-Archiv*, Vol. III, 1912, p. 59 and Plate III.

a breast and a back sheet,[1] and eight below these for the protection of the abdomen and loins. Combined with this leather sheet armor are tasses consisting of six or seven horizontal rows, each composed of small rectangular leather laminæ, arranged in vertical position. The leather sheets and plates are varnished red on the outside[2] and yellow on the lower side. Mr. Mueller remarks that parallels to this armor are hardly known, but that, as far as can be judged from the pictures preserved, a certain relationship, however distant, with ancient Chinese armor seems to exist. Unfortunately he does not state to what kind of pictures he refers, nor in what the supposed resemblance should consist. There is hardly any solid foundation for this opinion. This type of armor, on the contrary, although it agrees in some features with one represented on certain Chinese clay figures of the T'ang period (Plate XXXI), does not meet with any exact counterpart among Chinese specimens known to us; nor is such a connection at the outset very probable, since the affinities of *Man* armor, as has been pointed out, go with that of the *Shan*, and are accordingly focussed on another culture-zone.

Besides the word *kia*, another word for armor occurs in the *Shi king*, and this is the word *kiai* (No. 1518). It is once used with reference to great armor donned by a king;[3] and on another occasion it refers to a team of four horses in a war-chariot, clad with armor.[4] LEGGE, following the Chinese comment, is of the opinion that the meaning of *kiai* is identical with that of *kia;* but they are two different words written with two different symbols, and it is therefore justifiable to presume that they denote two different types of armor. As the word *kiai* is used to designate the scales of fishes, turtles, lobsters, and other aquatic scaly animals, it is most likely that it was this notion of the word transferred to a type of body armor, and that it related to scale armor (*lorica squamata*), the scales being cut out of hide or leather.[5] There is unfortunately no description of this armor in any ancient text. In the *Li ki* the word occurs several times, the rules of politeness excusing the warrior clad with a *kiai* from making a bow;[1] but nothing is brought forward to add to the knowledge of the subject.[2] I have never seen in China any suit of armor made of scales of leather; and they are not likely to have been made at later ages when metal was available. In Japan, such specimens have fortunately survived; and the one figured by Bashford Dean[3] may give us an excellent idea of the appearance of the ancient Chinese scaly leather coats. It is attributed to the Fujiwara period (around 1000 A.D.), and described as a primitive type of Japanese harness, the single laminæ being of boiled leather, cut and beaten into pieces shaped like fish-scales. A suit of copper scale armor obtained in Sze-ch'uan (Plate XIV) may be regarded as the natural continuation of the ancient leather armor of the same type. The scales are fastened by means of brass wire to a foundation of sack-cloth, and overlap one another. This specimen, weighing 38¼ pounds, as evidenced by the effects of many blows and bullet-holes visible in the metal, has actually been employed in warfare.[4]

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[1] Plastron and dossière.

[2] In accordance with the ancient Chinese cuirasses, as mentioned in *Tso chuan* (see above, p. 181).

[3] LEGGE, Chinese Classics, Vol. IV, p. 606.

[4] *Ibid.*, p. 131.

[5] LEGGE (*l. c.*, p. 194) states that the armor (not mail) for the horses was made of thin plates of metal, scale-like. It is most improbable that the scales were of metal at the time of the *Shi king*. See Chapter VII. The same semasiological development as in Chinese *kiai* is illustrated in the Tibetan word *k'rab* and the Burmese word *k'yap*, that in the first instance denote scale (scale of a fish), and secondly a body armor, which is now the usual meaning; and it is further interesting that Tibetan *k'rab* has also the meaning of "shield, buckler" (see JÄSCHKE, Tibetan-English Dic-

Scale armor is distinctly mentioned in the *Wan hua ku*, a work written at the end of the twelfth century; but this passage is taken from the *T'ang leu tien*, and therefore refers to the T'ang dynasty.[5] The

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tionary, p. 49). In all probability, the Chinese and Tibetan words *kiai* (or *kai*) and *k'rab* are anciently related, in the same way as Tib. *k'rag* ("blood") and Chinese *hiuet*, Tibetan *skrag-pa* ("to be afraid of") and Chinese *kiü* (W. Grube, Die sprachgeschichtliche Stellung des Chinesischen, p. 16), Tib. *sgrog-pa* ("to tie") and Chin. *kiao* (Conrady, Eine indochinesische Causativ-Denominativ-Bildung, p. VII). Also the Chinese word *kia*, "armor" (ancient pronunciation *kiap*, rhyme *hiap*), may be allied to Tibetan *k'rab*. It will be seen below (Chapter IV) that scale armor represents the earliest type of armor in Tibet, Persia, and India.

[1] Couvreur, Li ki, Vol. I, p. 65; Vol. II, p. 13.

[2] The scales of hide armor were called *kia cha* (No. 127). This may be inferred from a passage in the *Chan kuo ts'e* (quoted in *P'ei wên yün fu*, Ch. 97, p. 5 b), where Su Tai (third and fourth century B.C.; Giles, Biographical Dictionary, p. 682) addresses Yen Wang, and says, "You cut the scales of the buff-coat yourself, and your wife fastens them together by means of cords." The word *siao* (No. 4309), which is here utilized and means "to scrape, pare, trim," indicates that leather is in question, and that the leather strips were trimmed into a certain shape called *cha*. Regarding the technical meaning of this word see p. 210, note 3.

[3] Catalogue of the Loan Collection of Japanese Armor, p. 39 (*The Metropolitan Museum of Art*, Hand-Book No. 14, New York, 1903).

[4] Consul Bedloe (*Consular Reports on Commerce, Manufactures*, etc., No. 147, p. 494, Washington, 1892) states, "Scale mail, at an early period, was carried to a high perfection. The scales were applied to cloth or leather at first, as spangles are to gauze, and later as tiles or slates are to the boards of a roof. They were composed of iron, pewter, silver, gold, or of various oriental alloys. In making a suit, scales of one kind were usually employed, but combinations were frequent, in which metals of contrasting colors were used. A good suit of armor can be bought at prices ranging from $10 to $150."

[5] Bretschneider, Botanicon Sinicum, pt. 1, p. 160, No. 330. The above text will be found in the Chapter on Armor (*kia chou pu*) in *T'u shu tsi ch'êng*. *Ko chi*

third kind of armor known at that time is termed in that book *si lin kia* ("armor of thin scales"), and is classified among iron armor. The very name implies that it is a question of scale armor. The fourth variety of armor is styled *shan wên kia* ("armor with a mountain pattern"); a zigzag design or a continuous row of triangles being understood by the latter name. Also this, likewise made of iron, was perhaps scale armor;[1] as presumably also the fifth, designated "black hammer armor" (*wu chui kia*), likewise of iron. No descriptions of these pieces are furnished in the book mentioned.

Leather scale armor was still used by the Mongols, as attested by Friar WILLIAM OF RUBRUCK (1253), who states, "I saw two who had come to present themselves before Mangu, armed with jackets of convex pieces of hard leather, which were most unfit and unwieldy."[2]

In the Ming period the technical term for armor-scales is "willow-leaf" (*liu ye*). We read in the Statutes of the Ming Dynasty (*Ta Ming hui tien*) that in 1393 six thousand sets of "willow-leaf armor" and helmets of chain mail were ordered for the soldiers of the bodyguard serving in the Imperial City.

The great antiquity of hide scale armor is an important fact to us, as there are certain ancient clay figures on which this type of armor is represented. These belong to the earliest that we have, and range in the archaic period;[3] and it will be seen from the notes devoted to their dis-

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king yüan (Ch. 41, p. 3) and ***P'ei wên yün fu*** (Ch. 106, p. 73) give exactly the same quotation extracted from the ***T'ang leu tien*** (the "Six Statutes of the T'ang Dynasty"), drawn up by the Emperor Yüan-tsung in the early part of the eighth century (WYLIE, Notes on Chinese Literature, p. 67; and above, p. 189). The only additional matter prefixed to the latter text is that the thirteen kinds of armor enumerated were ordered to be made by the Imperial Armory (***wu k'u***).

[1] ***P'ei wên yün fu*** (Ch. 106, p. 74) quotes the ***T'ang shi lu*** to the effect that the armors called ***shan wên kia*** were made by the Emperor T'ai-tsung from iron (black metal) dyed in five colors, so that the "mountain pattern" may have been brought out by the color-work. Five-colored armor (***wu ts'ai kia***) is mentioned in ***T'ang shu*** (Ch. ***li yo chi***, ***ibid.***, p. 73). The Pek-tsi, a Korean tribe, brought "varnished armor of metal" (***kin hiu k'ai***) to the Chinese General Li Tsi (GILES, Biographical Dictionary, p. 421), who subjugated Korea between 644 and 658; on these armors, which were used by the Chinese cavalry, five mountain patterns (***shan ngu wên***) were represented by means of iron, which may be understood in the sense that five iron scales were arranged in such a manner as to suggest the design of a mountain. This passage is contained likewise in ***T'ang shu*** (Ch. 220, p. 3 b).

[2] W. W. ROCKHILL, The Journey of William of Rubruck, p. 261 (London, *Hakluyt Society*, 1900). In the Mongol period, designs of a tiger or lion skin, and the design of metal-armor scales, were also painted on hide armor (***Yüan shi***, Ch. 78, p. 12, K'ien-lung edition).

[3] The clay figures in our collection come down from different periods. A rigid classification coinciding with dynastic periods cannot be established: two large groups may be distinguished,— archaic and mediæval. The two merge into each other. The former may be said to comprise roughly the Chou and Han periods, and to go down perhaps with some types into the fourth and fifth centuries; the latter occupy an epoch from the sixth to the eighth century. The term "archaic" is merely

cussion in the second part of this publication that, according to my interpretation, they are intended for the figure of the ancient shaman[1] (*wu*, or *fang siang shi*).

Among the exorcists of the Chou period, the *Fang siang shi*[2] occupies a prominent place. According to the *Chou li*,[3] he donned a bear-skin decorated with four golden eyes,[4] black trousers, and a red jacket. Armed with a spear and a shield, accompanied by a suite of a hundred attendants, he performed the purifications of every season, searching through the houses and driving out disease. At a great funeral service he strided in front of the coffin, and accompanied it to the grave.

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intended to convey a chronological notion, but is not applied here with reference to technique or style. The age of the T'ang dynasty may safely be regarded as the *terminus ad quem* for the industry of burial clay figures, for we know surely enough that under the Sung and Ming dynasties the paraphernalia for the grave were carved from wood, but not modelled in clay. This question will be treated fully in Part II.

[1] Our word "shaman" is derived from the Tungusian languages (Manchu *saman*, Gold *šama*). The Mirror of the Manchu Language (*Manju hergen-i buleku bithe*) explains the word *saman* by means of the Chinese phrase *chu shên jên* ("a man who invokes or conjures the spirits"); and it is defined, *enduri weceku-de jalbarime baire niałma* ("a man who prays to and conjures spirits by sacrificing"). It is said in the same Dictionary that the *saman* acts near the sick-bed, and that there are male and female *samasa* (plural of *saman*). The Tungusian word has no connection whatever with Chinese *sha-men* (from Sanskrit *çramaṇa*, Pāli *samana*) denoting a Buddhist ascetic (YULE and BURNELL, Hobson-Jobson, p. 820); a Buddhist monk and a Siberian shaman will always remain two distinct affairs. PELLIOT (*Journal asiatique*, Mars-Avril, 1913, p. 468) has traced the word *šaman* in the language of the Niüchi to a Chinese document of the twelfth century. The identity of the notion conveyed by the Chinese word *wu* ("sorcerer") with the word "shaman" becomes evident from *T'ang shu*, where in the description of the Kirghiz it is remarked, "They call their sorcerers *kan* (*hu wu wei kan*)." The latter word (formerly articulated *kam*) is identical with Turkish *kam*, the general designation for the shaman in all Turkish dialects (compare W. SCHOTT, Über die echten Kirgisen, *Abhandlungen der Berliner Akademie*, 1865, p. 440). While reading the proofs, I receive No. 3 of the *Revue orientale* (Vol. XIV, 1914), in which J. NÉMETH devotes a special investigation to the origin of the word *šaman*: by applying methods of comparative philology, he arrives at the result that the word is an ancient property of the Turkish-Mongol languages.

[2] Chêng K'ang-ch'êng, in his commentary to the *Chou li* (BIOT, Vol. II, p. 150), explains the word *fang siang shi* as "expellers of formidable things," by substituting two other words for *fang siang* yielding this sense; but this conjecture is not adopted by the editors of the *Chou li* under K'ien-lung. BIOT translates the term, much too literally, by *inspecteurs de région*, or by *préservateur universel*. GRUBE (Religion und Kultus der Chinesen, p. 51) renders it "supervisors of the four points of the compass." DE GROOT (The Religious System of China, Vol. VI, p. 974) proposes the translation, "inspectors or rescuers of the country to the four quarters." These translations do not render account of the two words *fang* and *siang*: *fang* (No. 3435) means not only "place, region, quarter," but also "a recipe, a prescription;" and *fang shi*, according to GILES, is "a master of recipes,— a medicine man; a necromancer." The word *siang*^{4} (No. 4249) means "to judge of by looks; to practise physiognomy" (hence in Buddhism: the *lakshaṇa* or physical marks of beauty of a Buddha). The *fang siang shi*, accordingly, is a "doctor" who has two functions,— he prescribes medicines, and practises the art of physiognomy (*siang fa*).

[3] BIOT, Vol. II, p. 225.

[4] Apparently a mask, which was worn by the Chinese shamans in all exorcising ceremonies (see DE GROOT, The Religious System of China, Vol. VI, pp. 974–980, 1151, 1187 *et seq.*; also, Vol. I, p. 162).

When the coffin was lowered into the grave, he struck the four corners with the spear, in order to chase away the spirits *wang-liang*.[1] The bear-skin, a Chinese commentator explains, serves the purpose of lending him a formidable appearance; and the four golden eyes testify that he spies in the four regions of the empire all places where contagious diseases are raging. The spear seems to indicate that he combats malignant spirits, and the shield is his means of defence against their attacks.

The two figures of shamans represented on Plates XV–XVII are clad with tight-fitting, sleeveless leather jerkins, the material being cut out in the form of scales arranged in regular horizontal rows. On the front (Plates XV, XVII) the scales are carefully outlined in black ink or varnish over a coating of pipe clay;[2] on the back of one of the figures (Plate XVI) they are impressed in the surface of the clay, presumably by means of a stamp. This process is not applied to the other figure, whose back is plain. In both, the jerkin is held by means of a leather belt tightly drawn around the loins. It does not seem to have a slit in front, and was presumably put over the head. The shaman in Plates XV and XVI wears a hide helmet surmounted by a queer crest, and laid out in vertical grooves; on the back (Plate XVI) coifs of hide scales are attached to it. The other shaman (Plate XVII) is adorned with a snail-like, high tuft of hair held by a hoop. Both are manifestly represented in the attitude of warriors, displaying the same pose of arms and feet. The right arm is raised, the thumb being placed against the second finger: they are apparently in the act of throwing a spear; and the spear, presumably of wood, may have actually been in their hands. The left arm reaching forth with clinched fist, and the feet wide apart, correspond to this action; and the two men naturally concentrate their weight on their right sides. The lively fighting attitude and the body armor show us that the two shamans are engaged in a battle with the demons; and, if the tradition of the Chinese is correct that such clay figures were interred in the graves during the Chou period, we may infer that, as the shaman warded off pestilence and malignant spirits from the grave before the lowering into it of the coffin, he continued in this miniature form to act as the efficient guardian of the occupant of the grave.

Helmets bedecked with scales occur also in Chinese illustrations (Fig. 33), and seem to have remained in the possession of shamans, even though they did not don the scale armor. The clay figure of a magician

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[1] No. 12,518. These sprites are mentioned among those haunting travellers in the sand deserts of Turkistan (*Pei shi*, Ch. 97, p. 5).

[2] It is impossible to bring these fine lines out in the photographs.

(Plate XVIII), which is much later than the two others shown and presumably no older than the T'ang period, has a helmet with hood, on which rows of scales are outlined in ink. A cape of tiger-skin envelops his shoulders. He wears a necklace and jewelry with floral designs on his chest. His coat is girdled; and a shirt of mail, presumably plate mail,[1] is emerging from beneath it. In his left hand, which is perforated, he seems to have seized a spear or sword.[2] A rectangular bag, which possibly serves for the storage of his paraphernalia, is attached to the belt on his left-hand side. The wearing of a coat over the armor is characteristic of the T'ang period; and the artistic, though conventional, modelling of the face would seem to point to the same epoch.

In general, the conditions of defensive armor, as encountered in the archaic epoch of China, show a striking coincidence with those found in other ancient and primitive culture-groups of Asia, and those still alive in primitive societies. On the whole, the military equipment of the ancient Chinese in principle agrees, for instance, granted the difference of material, with that of the Scythians as described by STRABO (VII, 3), who states that they used raw ox-hide helmets and cuirasses, wicker shields, spears, bows, and swords.

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[1] See Chapter V.

[2] Presumably one of wood, which has decayed under ground.

III. DEFENSIVE ARMOR OF THE HAN PERIOD

> "Your servant understands that, according to the classics, the perfection of government consists in preventing insurrectionary troubles, and the highest point of military art is to avoid the occasion of war."
>
> YANG HIUNG in *Ts'ien Han shu.*

The sculpture of the Han period unfortunately furnishes no decisive contribution to the question of body armor. While possibly the artists may have intended in some cases to represent armor, as perhaps in some of the fighting horsemen, the stone work does not minutely indicate texture, and the material is such that no positive inferences can be drawn from it.[1] The only piece of defensive armor that is clearly enough outlined on these monuments is the shield or buckler, usually handled in connection with a sword. It is oblong and rectangular in shape with a convex curvature in the centre, causing a hollow on the inner side where the wearer's hand finds its place, and is notched in the middle of the upper and lower ends (Fig. 25). It is a parrying shield easily movable, and sufficient to protect the left arm and to ward off blows struck at it.[2]

It is notable that many soldiers represented on the Han monuments carry their shields also in their right hands, while manipulating the swords in their left; I presume that the fighters, when wearied out, sought relief in this manner by changing weapons from one hand to the other. In Fig. 25 a left-handed, and in Fig. 26 two right-handed shield-bearers have been selected. The same shield is employed also by soldiers fighting from war-chariots.

Another form of shield is much larger, more convex, almost roof-shaped, decorated with what appears like a tree design, and capable of hiding a man's face and the upper part of his trunk (Fig. 27).[3]

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[1] The difficulty of studying from the bas-reliefs the costume and the ornaments displayed on it, is acknowledged also by M. CHAVANNES in his recent work Mission archéologique dans la Chine septentrionale, Vol. I, part 1: La sculpture à l'époque des Han, p. 39 (Paris, 1913). On a stone of the Hiao-t'ang-shan, M. CHAVANNES (p. 82) has correctly recognized some warriors clad with cuirasses; but hardly any other conclusion than that it is in general the question of hide armor can be drawn from these representations. These warriors are barbarians styled *Hu*, and in all probability Huns (*Hiung-nu*, who are frequently termed also *Hu*). We shall come back to this monument below in speaking of the tactics of the Huns.

[2] See, for example, CHAVANNES, Mission, Nos. 131, 136.

[3] *Ibid.*, No. 190. CHAVANNES (La sculpture à l'époque des Han, p. 251) states that this buckler is of rattan, doubtless for the reason that there are still rattan shields in China; but these are always circular, almost half-spheroidal, and plaited in basketry style. The present specimen is a rectangle, and exhibits no characteristic features of

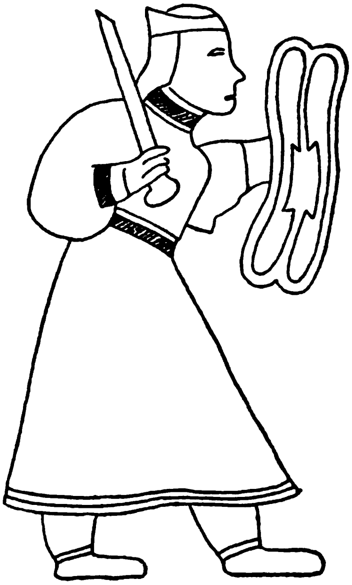

FIG. 25.
Left-handed Shield-Bearer (Sketch from Rubbing of Han Bas-relief).

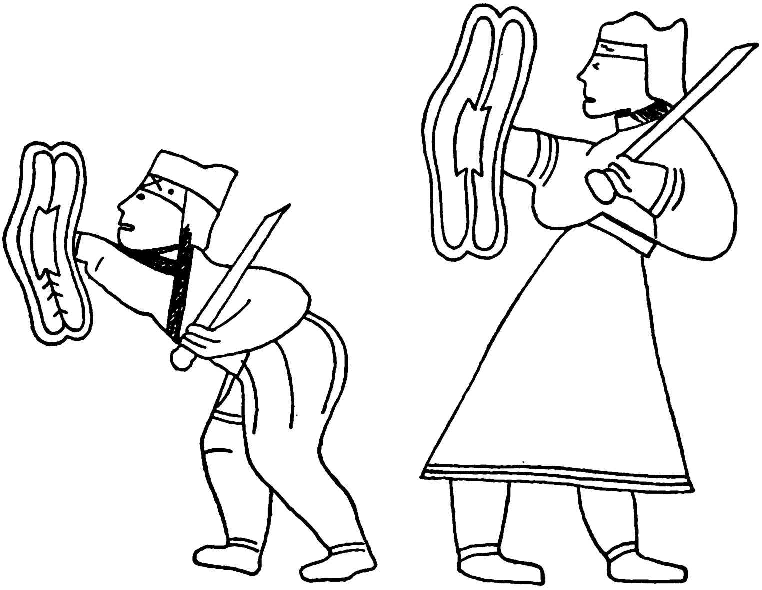

FIG. 26.
Right-handed Shield-Bearers (Sketch from Rubbing of Han Bas-relief).

In the "Battle on the Bridge,"[1] a picture executed with a great deal of life and motion, the manner of handling the buckler in close combat is vividly illustrated. The commander of the force, passing the bridge in his chariot, defends himself with his sword against an arbalist whose crossbow he has adroitly overturned with a thrust of his shield, while a footman is attacking his rearing horse

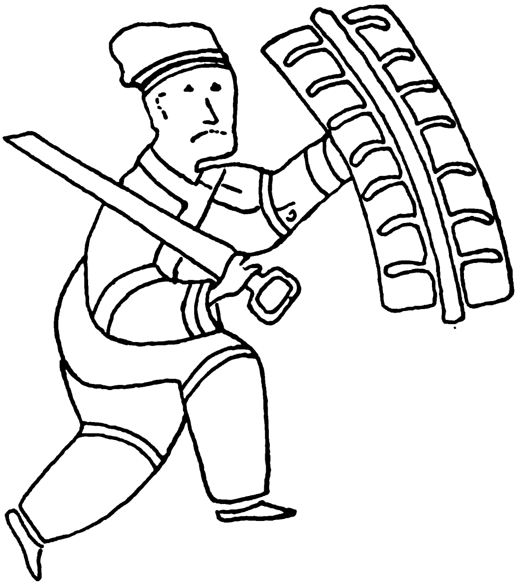

Fig. 27.
Han Soldier with Rectangular Buckler (Sketch after Chavannes, Mission, No. 190).

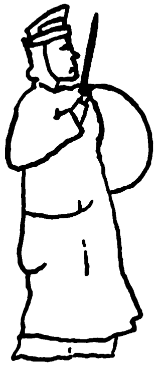

Fig. 28.
Soldier with Circular Buckler (Sketch from Rubbing of Han Bas-relief representing the Battle on the Bridge).

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rattan plaiting. It is much more likely to be of wood covered with hide, on which the design is painted. The rattan shields have often been described and illustrated (Amiot, Art militaire, *Mémoires concernant les Chinois*, Vol. VII, p. 371, and Plate XXX, figs. 10 and 11; de Guignes, Voyages à Peking, Vol. III, p. 20; Atlas of Staunton's Embassy, Plates XVII and XIX, No. 5, etc.). In Peking I had occasion in 1901 to see these shields used by fencers, and procured two specimens painted with tiger-heads for the American Museum, New York. The general opinion of the Chinese is that rattan shields are a matter of recent development, and that originally shields were made from a combination of wood and hide (see *Huang ch'ao li k'i t'u shi*, Ch. 15, p. 21, where the earliest relevant text quoted is the *Ki siao sin shu* of 1566 by Tsi Ki-kuang, followed by the *Wu pei chi* of 1621 by Mao Yüan-i). The earliest illustration of the rattan shield I am able to trace is in the *Lien ping shi ki* (Ch. 5, p. 5, ed. of *Shou shan ko ts'ung shu*, Vol. 52), written in 1568 (Wylie, Notes, p. 91). Merely judging from its circular shape, the round shield above referred to, in the hand of the soldier at the foot of the bridge, might be a rattan shield; but I venture to doubt that the latter was in existence during the Han period. The shield in question may as well be of wood or hide (compare Figs. 28, 30). The rattan shield painted with a tiger's head was officially introduced into the army under the Manchu. This troop was uniformed with a short jacket of yellow cotton stuff on which tiger stripes were represented in black, a pair of leggings and boots with the same design, and a hood in the shape of a tiger-head (see *Huang ch'ao li k'i t'u shi*, Ch. 13, pp. 49–50; the shield is figured and described in Ch. 15, p. 21).

[1] Chavannes, Mission, No. 136.

with a spear. On this representation we notice another type of shield of circular shape (Fig. 28) on the arm of a warrior who is posted on the left-hand side at the foot of the bridge. The question as to the material from which this shield may have been wrought is not susceptible of positive decision. Certain it is, however, that three distinct types of buckler are depicted on the monuments of the Han.[1]

Of the three types of Han bucklers, the first may be ascribed as peculiar to the period, in so far as it does not seem to have survived in later ages; it is not alluded to in military literature, nor is it traceable among the specimens of shields in vogue during the Ming and Manchu dynasties. The case is different with regard to the two remaining types. The greatest authority on military matters is Mao Yüan-i, who published his work *Wu pei chi* (not mentioned by Wylie) in 1621 (80 volumes). It is the most comprehensive work of this class, and the one best illustrated. All relevant illustrations of the *T'u shu tsi ch'êng*, which quotes this author as Mao-tse, are derived from his work. In accordance with an older work *Wu king* ("Canon of Military Matters"), he discriminates between two main types of shields, the long shield of the footmen (Fig. 29), and the round shield of the horsemen (Fig. 30). The former is entirely made of wood, and, being as tall as a man, completely screens his body. It rests on the ground, and is a veritable fence or bulwark.[2] The latter, of wood covered with hide, is carried by the cavalier on his left arm, which is passed through the two straps in order to protect his left shoulder against arrow-shots, while he brandishes in his right hand the short sword.[3] Mao admits that it offers no advantages, and it certainly was more an encumbrance than a safeguard. As the round buckler is peculiar to the horsemen, we may suppose that the Han soldier armed with it is an equestrian engaged in a dismounted combat. There are instances on record to the effect that the soldiers, especially when the decisive moment approached, dismounted from their horses, marched on foot, sword in hand, and engaged in close combat.[4]

From the wooden documents of Turkistan recently edited and translated by M. CHAVANNES we learn that the shields used by the soldiers of the Han period were red; that is to say, they were made of wood, and

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[1] Thus likewise CHAVANNES, La sculpture, p. 37.

[2] This is the same type of shield as that figured and described by PH. F. V. SIEBOLD (Nippon, 2d ed., Vol. I, pp. 336, 337).

[3] The horsemen of the Kirgiz, who wore wooden cuishes, fastened a round shield to their left shoulder to ward off arrow-shots and sword-cuts (*T'ang shu*, Ch. 217 B, p. 8).

[4] Compare the battle deciding the fate of Hiang Yü in *Shi ki*, Ch. 7 (CHAVANNES, Les Mémoires historiques de Se-ma Ts'ien, Vol. II, pp. 318–320).

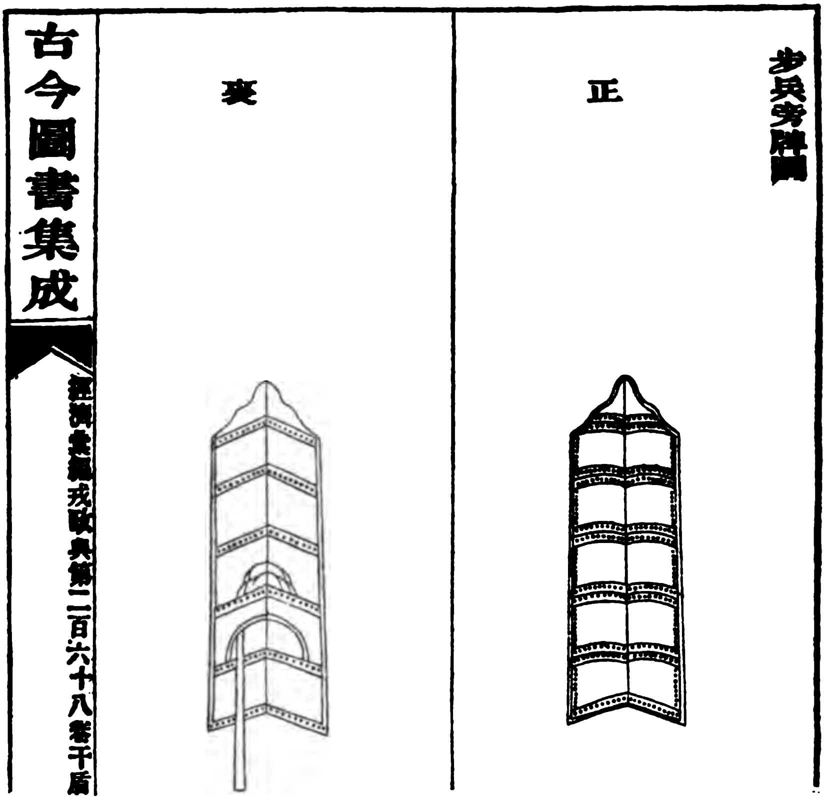
步兵旁牌圖
正
裏
古今圖書集成
經濟彙編戎政典第二百六十八卷干盾

FIG. 29.
Shield of Foot-Soldiers, Exterior (to the right) and Interior (to the left). From *T'u shu tsi ch'êng*.

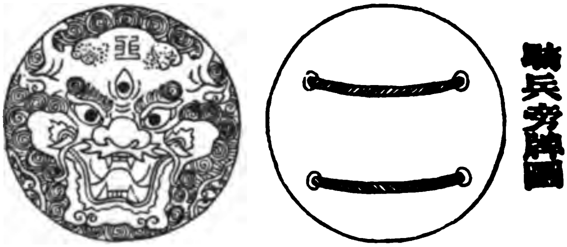

FIG. 30.
Round Shield of Equestrian Soldiers, Exterior and Interior.

coated with a red varnish to protect the material from the influences of the weather.[1] They were turned out in the official armory of Nan-yang in Ho-nan Province,[2] and in all probability were adorned with the tail-feathers of pigeons fastened to the lower edge. The wooden documents employ the word *tun*,[3] once formed with the classifier 'spear' (*mao*);[4] and in one passage[5] appears the word *p'ai* (No. 8574), which, as far as I know, is thus attested for the first time in the Han period.[6]

In his Introduction M. CHAVANNES has given an admirable summary of the information garnered in these early documents, and has drawn a vivid picture of the garrison life in those outposts of the Chinese empire.[7] He has sounded also the sentiments by which those soldiers were animated, by rendering several fine pieces of poetry of the T'ang period. There is still another, contemporaneous source which permits us some inferences as to the emotional life of those brave Han frontier-guards. CHAVANNES[8] has ably described the function of the signal-towers erected along the frontier at intervals averaging thirty *li*, which served as optical telegraphs announcing the approach of hostile vanguards by means of huge beacon-fires. In many cases the guards stationed in these towers were kept alert in repelling undesirable invaders.[9] In the burial pottery of the Han period, which is a microcosm of the culture life of those days, we find a number of miniature models

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[1] Compare above, p. 189.

[2] It seems to have been customary in the Han period to occasionally inter armor and shield with a general. We learn that the son of the marshal Chou Ya-fu purchased from an officer of the Imperial Armory a cuirass and buckler intended for the funeral of his father (L. WIEGER, Textes historiques, p. 448). This act led to an accusation against the old general, which resulted in his suicide; the illegal point of the case, however, was sought in the step of purchasing imperial property, not in the intended burial; and the charge was forced, as the Emperor was intent on causing the downfall of the old officer. The *Ku kin chu* by Ts'ui Pao of the middle of the fourth century relates that in the third year of the reign of the Emperor Chang (78 A.D.) people dug up the ground of a burial-place at Yüan in Tan-yang (An-hui Province) and found in it a piece of armor. It was a cuirass (*kia*).

[3] CHAVANNES, *l. c.*, Nos. 77, 763.

[4] No. 75.

[5] No. 682.

[6] The Annals of the Han Dynasty employ neither of these words, but the word *shun*.

[7] I can only join Mr. L. C. HOPKINS (*Journal Royal As. Soc.*, 1914, p. 475) in the wish that the substance of this essay may be made more generally accessible. Perhaps the Royal Asiatic Society itself might undertake to publish an English translation of it in a separate issue.

[8] *L. c.*, pp. XI–XIII.

[9] To quote one example, in 108 A.D., the K'iang (Tibetans) with a force of over ten thousand men attacked the watch-towers near Kan-chou fu in Kan-su Province, and killed or captured the officers and privates occupying them (CHAVANNES, *T'oung Pao*, 1906, p. 257). Beacon-towers in which lookout soldiers were kept, *tun t'ai* (No. 12,205), were still in existence under the Ming dynasty, and are well described by Persian travellers in the fifteenth century (see BRETSCHNEIDER, *China Review*, Vol. V, p. 34). Compare Fig. 31.

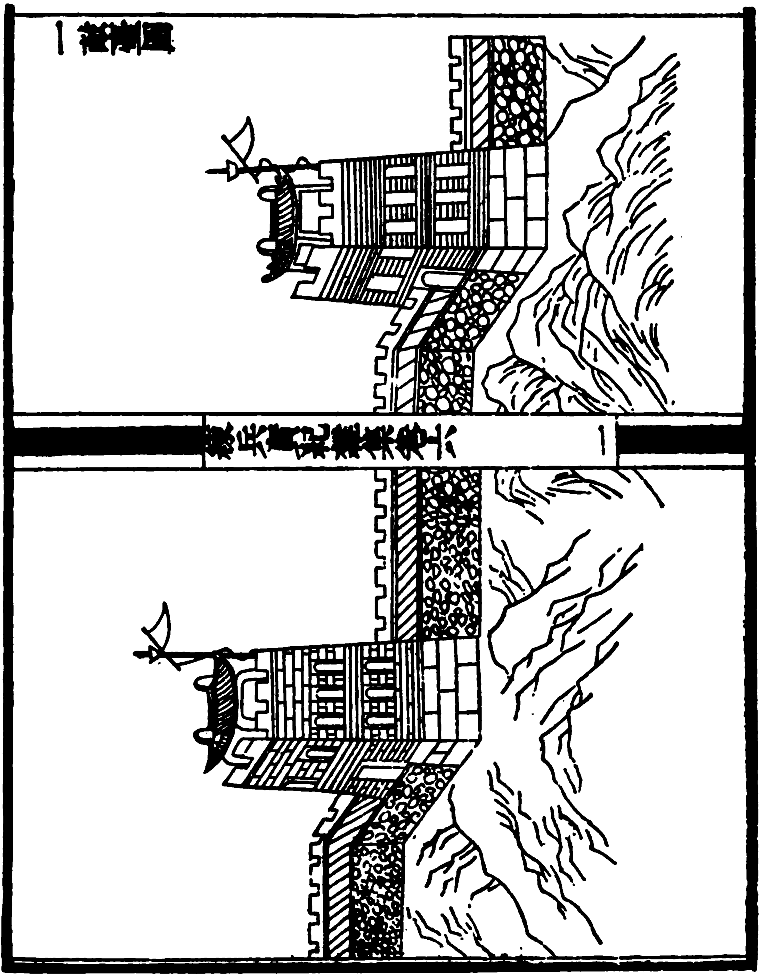

FIG. 31.
Military Watch-Towers of the Ming Period (from *Lien ping shi ki* of 1568).

representing such watch-towers; and all these, according to the unanimous testimony of the Chinese, have been found in graves of Kan-su Province. The conclusion would seem justified that pottery of this type was interred, as worthy emblems of their martial calling, with renowned officers who had deserved well of their country in the frontier wars and had died the honorable death of the soldier. On Plate XIX is illustrated a green-glazed model of a three-storied watch-tower rising from the bottom of a round bowl: on the two parapets and roofs the sentinels are engaged in showering from their crossbows a volley of darts on an advancing column of scouts.[1] Here we enjoy seeing before us in action the undaunted heroes of the Hunnic wars whose sentiments were immortalized by Li Po. The imposing loftiness of the structure standing with the force of a pyramid, the beautiful architectural forms, the jutting wooden beams supporting the corners of the parapets, are notable features making this bit of clay a live and unique document of the culture of the Han period.

There are also less elaborate pottery models of such watch-towers. One in the Museum collection[2] shows a single story with windows on three sides and a door ajar in the front wall; the windows are provided with elegant lattice-work. Another specimen[3] represents the section of a city-wall with a roofed, square tower in the corner, to which a staircase leads up.

The most signal fact about defensive armor under the Han is that metal suits gradually made their way during this period. We meet, for the designation of it, a new word *k'ai* (No. 5798), written with a character in which the classifier *kin* ("copper"[4] or "metal") enters, and which does not occur in the ancient canonical texts. From the terminology of the dictionary *Shuo wên* (around 100 A.D.) we gather that armature had then grown more complete, that there were metal helmets (*tou mou*), brassards (*han*),[5] and metal protectors for the nape (*ya-hia*).[6] The old word *han* (p. 175) was now likewise connected with the classifier "metal" (No. 3816); and an entirely new word *ye* (No. 12,996), composed of the phonetic element *ye* ("leaf") and the same classifier, springs up to denote a new contrivance in the structure of protective armor,— a metal lamina (literally "metal leaf"). These facts combined go to prove that far-reaching innovations had set in after the close of the

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[1] This beautiful piece of Han pottery is in the collection of Mr. Charles L. Freer of Detroit, to whom I am greatly indebted for the photograph and his kind permission to publish it. The object was acquired by Mr. Freer as early as in the seventies, and is the first specimen of Han pottery that came to America; presumably it was even the first to come out of China.

[2] Cat. No. 118,489; 27.5 cm high, green glaze decomposed into silver oxidation.

[3] Cat. No. 120,901; gray clay, unglazed; excavated by Dr. Buckens, physician in the service of the Peking-Hankow Railway, near Chêng-chou, Ho-nan Province.

[4] "Copper" is probably the original meaning, but not, as supposed formerly, "gold." In the *Chou li* gold is always designated *huang kin* ("yellow metal").

[5] GILES (No. 3791) translates "greaves; leg-guards for soldiers," which is doubtless also correct; but the definition of this word in the *Shuo wên* is *pei k'ai;* that is, arm-guards.

[6] See COUVREUR, Dictionnaire chinois-français, p. 115 b (also in PALLADIUS, Chinese-Russian Dictionary). Compare Chinese text opposite.

錏頸鎧也从金
鍜亞聲烏牙切

臂鎧也从金
干聲矦旰切

鍱也从金集
聲秦入切

Chou dynasty, and that the Han period must have revolutionized the entire method and technics of armature. Chêng K'ang-ch'êng, the famous commentator of the *Chou li*, who lived in the second century A.D., says anent the armorers of the Chou time[1] that the ancients employed hide in the manufacture of corselets (*kia*), but that now (in the author's time) metal (*kin*) was utilized for the same purpose, and that this product is designated *k'ai*. Of what metal was this new armor made? And what type of armor was represented by it? The most interesting contribution to this question is made by Chung Ch'ang-t'ung, an author who lived in the beginning of the third century A.D., and who is known as the editor of the Taoist writer Yin Wên-tse.[1] He is quoted as follows in the *Yen fan lu*:[2] "In days of old, war-chariots were employed in warfare, and the fashion of iron plates was not yet in use for armor; at the present time, hide armor, though it can still offer sufficient resistance to a crossbow, will needs lead to the loss of the army and the destruction of the empire. Regarding this matter, it was at the time of the Posterior Han (25–220 A.D.) that armor received iron laminæ, but it is not known what the state of affairs was at the time of the Anterior Han (B.C. 206–23)." Here it is plainly expressed that iron armor came up under the Later Han dynasty, and the expression *t'ie cha*[3] leaves no doubt that it was armor composed of iron laminæ.

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[1] BIOT, Chou li, Vol. II, p. 152.

In this connection another notice incorporated in *Ko chi king yüan* (Ch. 41, p. 1 b) would be of interest, if any dependence could be placed as to the value and the time of the source from which it is quoted. This is a work called "Dissertation on Corporal Punishments" (*Jou hing lun*) by K'ung Jung, a descendant of Confucius in the twentieth degree, who, according to GILES,[4] died in 208 A.D. Nothing is known to me regarding this work; M. PELLIOT, in his careful bibliographical study of Chinese law,[5] does not mention it. In the present case, it would be indispensable to know exactly when that work was composed, as the author lays stress on a contemporaneous event, and to ascertain whether the incriminated passage was really contained in the original edition. Not being able to do so, I can give it only with all reserve: "The holy men of antiquity made armor of rhinoceros-hide; now the *pên ling*[1] have iron armor."

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[1] WYLIE, Notes on Chinese Literature, p. 156; L. WIEGER, Taoisme, Vol. I, Le canon, p. 184, No. 1159.

[2] Completed in 1175 by Ch'êng Ta-ch'ang (WYLIE, Notes on Chinese Literature, p. 160) and reprinted in the *T'ang Sung ts'ung shu*.

[3] The word *cha* (No. 127) refers to the wooden or bamboo tablets used for writing and united into bundles of books before the invention of paper. The discoveries in Central Asia have rendered us familiar with the form of these wooden documents. The plates, as used in the manufacture of armor, have indeed a very similar shape; and hence the transfer of the name of the latter is easy to understand. COUVREUR (p. 736 b) translates *cha* by "les couches de cuir ou les plaques de métal qui composent une armure;" PALLADIUS in his Chinese-Russian Dictionary (Vol. II, p. 379) by "fish-scale, armor;" GILES gives the meaning "a layer" and "numerative of *kia*, armor." There are some passages in the *Tso chuan* and *Han shi wai chuan* (see *P'ei wên yün fu*, Ch. 97, p. 6) where *cha* doubtless relates to the different layers of a hide armor; but as a rule it originally refers, as stated above (p. 196), to the scales of a hide scale armor. This is also the opinion of K'ung Ying-ta (574–648), who, in his work *Shang shu chêng i*, gives the following definition of the word *ye* (No. 12,996),—"metal lamina or plate in armor; the metal lamina of armor is the same as that is called *cha* in the *K'ao kung chi* (in the *Chou li*)." The word *cha*, however, does not occur in the text of the *Chou li*, but only in the commentaries. In the same sense, the K'ang-hi Dictionary defines the word *cha* as *kia ye*, "armor leaves," that is, plates or laminæ covering the armor.

[4] Biographical Dictionary, p. 401.

[5] Le droit chinois (*Bulletin de l'École française d'Extrême-Orient*, Vol. IX, 1909, pp. 27–56).

The fact that the word *k'ai*, and the new type of body armor understood by it, were actually employed during the Han period, is now obviously brought out by the contemporaneous wooden slips discovered in eastern Turkistan, and which have been edited and translated by E. CHAVANNES.[2] As already mentioned, the word *k'ai* occurs there on two of the wooden documents (Nos. 758, 794); while the ancient word *kia* is preserved in three other cases. Both types, *kia* and *k'ai*, accordingly, were in use among the outlying Chinese garrisons of the Han period; and as explicitly recognized by Chinese authors, the *k'ai* differed from the *kia* in the essential point that they were reinforced by metal pieces. The foundation of the armor *k'ai* consisted likewise of leather or hide; and in CHAVANNES' document No. 794 the question is of "four pieces of hide, two halves being so connected as to make two suits of armor." The "halves" seem to refer to two large pieces of hide covering chest and back.

The metal helmet appearing under the Han and perhaps under the Ts'in dynasty (p. 175) is the natural accompaniment of metal armor; the *galea* of ancient times gives way to the *cassis* (Figs. 32, 33). The word *tou mou* for the metal helmet mentioned above appears, indeed, on one of the contemporaneous wooden slips of the Tsin dynasty (265–313).[3]

If the metal of the Later Han dynasty was iron, — what was the metal employed during the Former Han dynasty? And what was the shape of the metal pieces attached to the hide foundation?

It is not very likely, for technical reasons, that hide armor was immediately followed by armor consisting of iron laminæ. The latter denotes a much more advanced stage of civilization, and presupposes acquaintance with the art of forging iron; it is also a much more complicated structure, its manufacture requiring a skill far superior to the more mechanical mode of preparing a coat of hide. We are fortunately in a position to show from both literary and archæological evidence that iron hide armor was preceded by copper hide armor. In the work *Yen fan lu* quoted above, the observation is made that "in the times of remote antiquity and in the period anterior to the Ts'in and the Han leather armor named after the rhinoceros was much used in the army, but that in the records of Se-ma Ts'ien's *Shi ki* mention is made of armor fabricated from forged copper (*tuan kin wei kia*); that, however, on close examination, the employment of the latter is still much restricted."[1]

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[1] Apparently the title of a military office at the time of the Han dynasty.

[2] Les documents chinois découverts par Aurel Stein dans les sables du Turkestan oriental (Oxford, 1913).

[3] CHAVANNES, *l. c.*, No. 794.

We shall not be far wrong in concluding that the metal pieces employed for the reinforcement of armor in the period of the Anterior

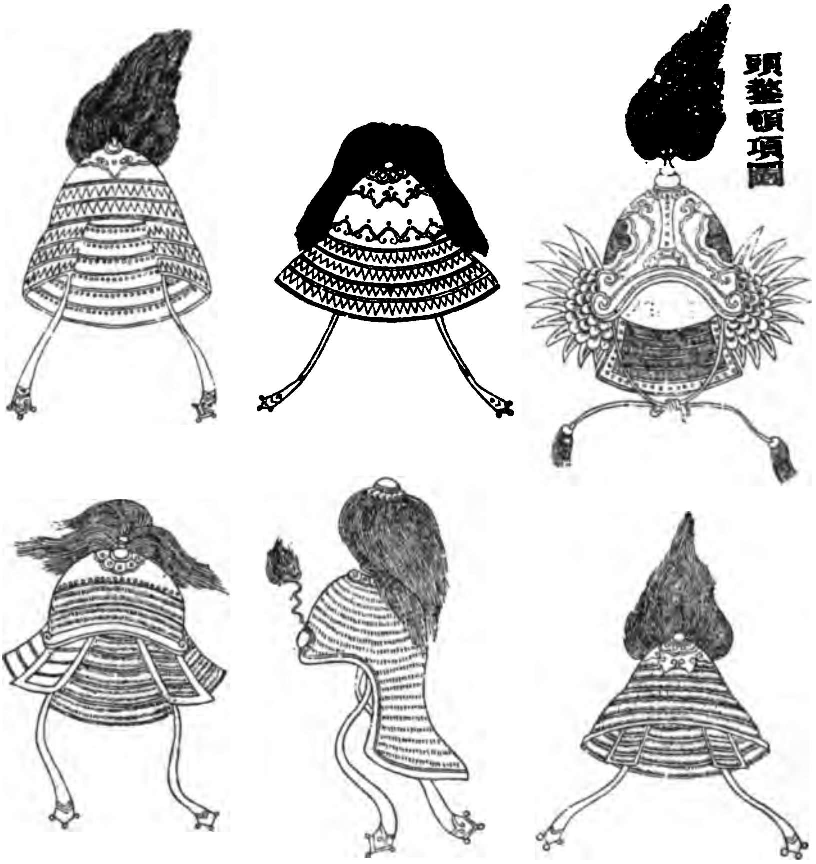

FIG. 32.
Sketches of Helmets (from *T'u shu tsi ch'êng* which reproduced them from *Wu pei chi*), representing the Tradition of the Ming Period.

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[1] The expression "to forge defensive armor" (*tuan kia*) occurs in *Shi ki*, Ch. 112, in the biography of Chu-fu Yen (compare *P'ei wên yün fu*, Ch. 106, p. 56 b). In the age of the Three Kingdoms (221–277) metal armor, for which copper or iron was utilized, was firmly established, as we see from the life of the famous General Chu-ko Liang (*San kuo chi*, *Wu chi*, Ch. 19, p. 1 b), who lived from 181 to 234 (see GILES, Biographical Dictionary, p. 180). In *Tsin shu* and *Sung shu*, metal armor is frequently mentioned. An iron mask (*t'ie mien*) for the protection of the face is first mentioned as being employed in the period Yung-kia (307–313 A.D.) by General Chu Ts'e (styled Chung-wên) in the battle of Hia-k'ou, in Han-yang fu, Hu-pei Province (*Tsin shu*, Ch. 81, p. 6).

Han were of that metal then most generally employed,—copper. And a number of perforated, thin copper plates exhumed in the environment of Si-ngan fu from a grave of that epoch tends to confirm this opinion. These laminæ, some of which are sketched in Fig. 34, can but have served the purpose of being sewed on to the surface of a cuirass. They were employed for the making of a *k'ai*, and formed the natural continuation of the ancient scale armor *kiai* discussed at the end of the previous chapter. The scales in the latter were cut out of leather: in the third and second centuries B.C., the Han made a decided advance by gradually transforming these leather into copper scales; and the Posterior Han, in the first centuries of our era, went a step farther in substituting iron for copper. The specimens in Fig. 34 demonstrate that the copper pieces leaned in their forms toward scales, though they approach to a higher degree the shape of a leaf (hence the term "leaf" which we meet in the Han authors). A slow and gradual development must have been

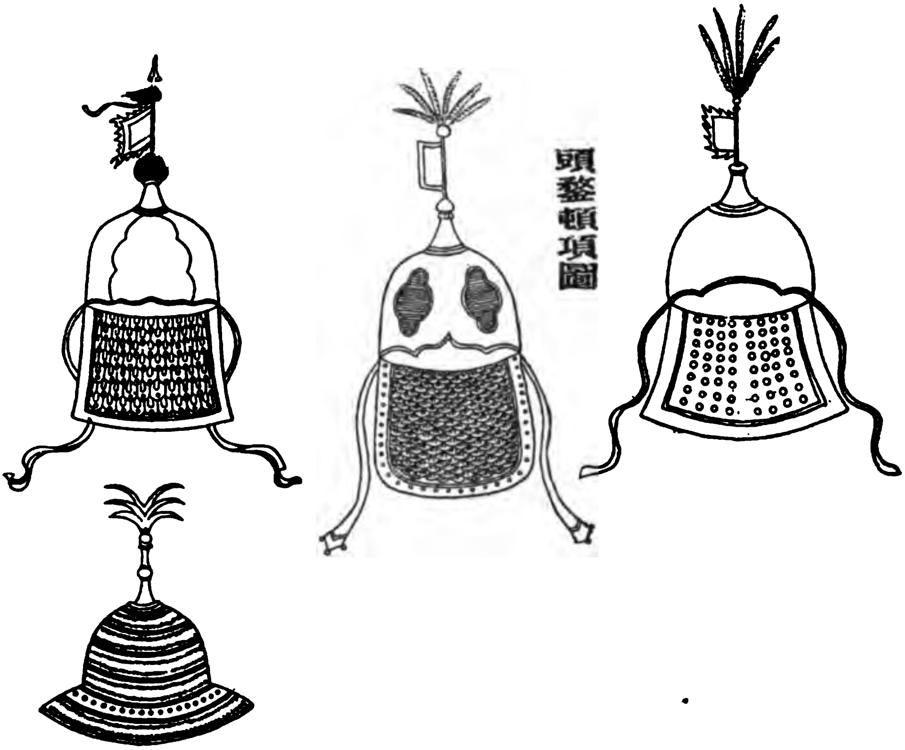

FIG. 33.
Sketches of Helmets (from *T'u shu tsi ch'êng* which reproduced them from *Wu pei chi*), representing the Tradition of the Ming Period.

in operation toward effecting that uniform oblong, rectangular shape which we are wont to designate as "plate." There is, for lack of monuments, as yet no means of exactly ascertaining the date when this type of regular iron plate armor sprang up in China. The term *t'ie cha* employed by Chung Ch'ang-t'ung, discussed above, is very tempting in leading us to assume that it existed at least toward the end of the Posterior Han period in the third century A.D.; the word *cha* relates to the rectangular wooden writing-slips still prominent in the administrative system of the Han, and the application of this word to the plates of an armor is most happy. As these wooden slips possessed regular forms, we are allowed to infer that also the iron plates in the armor of the Han were gradually adapted to the same uniform standard. In the age of the T'ang (618–906) iron plate armor presents itself as an accomplished fact, and was made with a technical perfection which must have been preceded by centuries of diligent and intelligent practice (see Chapter V).

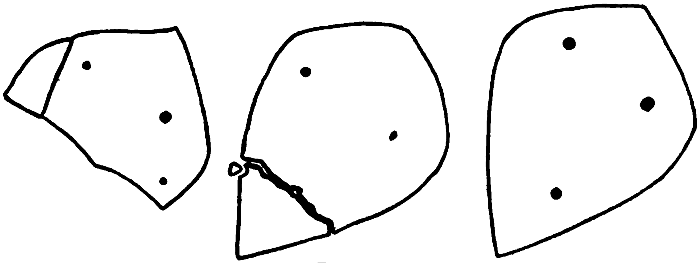

FIG. 34.
Bronze Scales of Armor of Han Period (half of actual size).

The existence of protective laminæ of rectangular shape under the Han may be inferred also from another matter peculiar to that age.[1] In the biography of Ho Kuang, who died in B.C. 68, the great "king-maker" of the Han dynasty, as Mayers calls him, mention is made of "jade clothes" (*yü i*). Yen Shi-ku (579–645), the famous commentator of the Han Annals, explains this term as denoting a coat of the form of an armor (*k'ai*), consisting of jade slabs joined together by means of gold threads; these jade slabs were shaped into regular plates (*cha*), one foot long and two inches and a half wide; they formed a perfect enclosure, and reached down to the feet. Another style of this garment, compared likewise with armor by Yen Shi-ku, was composed of strung pearls or beads in the upper part, while only the skirt was formed by jade plates. It is self-evident that these jade plates, of which we hear nothing at any earlier period, were produced in imitation of metal armor-plates; and Yen Shi-ku's simile with an armor strongly supports this opinion.

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[1] The following information is drawn from the *Han tsien* (No. 1648) of Kua Ts'ang-lin of the Sung; the edition before me is by Wu Ki-ngan of the Ming, and was published in 1600. This is a most valuable work for the study of Han culture, being arranged in the form of a glossary of subject-matters (corresponding to our archæological dictionaries) extracted from the Han Annals together with the commentaries; it allows us to ascertain at a glance what objects of culture existed under the Han.

By what factor was the innovation and progress of the Han in matters of defensive armor caused? The development of the defence of the body moves along as the natural consequence of the advance in weapons of offense. "The history of invention as applied to war has been the record of alternate advances in this line, and in overcoming defence." [1] The steadily growing perfection of weapons necessitated a corresponding increase in the efficiency and power of resistance of body armor. The chief weapons of the Chou period were spear and bow; and the armor of rhinoceros-hide offered to them adequate opposition. In the age of the Han we meet the more effectual crossbow and the two-edged sword; and Chung Ch'ang-t'ung justly says that hide armor then was no longer a suitable shelter for the arrows shot from crossbows, if the interests of an army were to be maintained. The copper or bronze swords in vogue among the Former Han dynasty gradually gave way to iron swords under the Later Han dynasty; and parallel with this movement, we notice a logical development from plain hide and hide scale armor to copper scale and iron scale, and ultimately to iron plate armor. Thus, judging from appearances, it may be conceived that this sequence in the gradual perfection of armor might have been evolved from purely inward causes and necessities, and that no factors of any outward influence need be invoked in order to account for it; but such a conclusion hazarded without any regard to historical agencies would be plainly illusory.

It cannot be denied that an entirely different point of view may be pursued in this problem. It may be argued that the Chinese, despite the numerous aggressive and defensive wars which they have made on the adjoining tribes, cannot be called, in the strict sense of the word, a warlike nation, and that they were always deficient in inventions of military implements. At all times they were ready to adopt any superior arms from their more belligerent neighbors, and to vanquish their enemies with their enemies' devices. The crossbow is properly claimed as a contrivance of the aboriginal tribes of southern China; and the type of the short bronze sword of the early Han (see Plate XX) bears such a striking similarity to that of the Siberian bronze age, that imitation due to historical contact may justly be suspected. Under the Han, cast-bronze swords (Plate XX) gradually gave way to cast-iron swords (Plate XXI), the latter being cast in the same shape as the former. The process of transformation is identical with the one that we observe in the antiquities of Siberia. The excellent plates of ancient Siberian bronze and iron swords published by W. RADLOFF,[1] in which bronze is colored green and iron brown, afford a good object-lesson for the study of the gradual transition from bronze to iron: here, for instance, we note that the hilt is changed into iron, whereas bronze is retained for the blade (Plate XII, No. 4); or that the blades become iron, and the hilts remain of bronze (Plate XIII, Nos. 1–3), until ultimately there spring up types purely of iron which faithfully preserve the forms and ornaments of the more ancient bronze swords. We know from literary documents that the Han still turned out weapons of bronze, that under the Former Han the latter were gradually superseded by iron weapons, and that these were definitely established under the Later Han: the year 219 may safely be regarded as the term when weapons were made exclusively from iron, and when bronze was discarded for this purpose.[2] It will therefore be in general correct to assume for archæological purposes that bronze swords bearing the characteristics of the Han, with greater probability belong to the period of the Former Han dynasty (B.C. 206–23), while cast-iron swords of the same features most probably range in the period of the Later Han dynasty (25–220 A.D.). The casting of iron for implements of every-day use is peculiar to that age: the Chinese then ingeniously applied to iron the same process as formerly to bronze, casting it in sand moulds, and perpetuating in the new material their ancient bronze forms. Thus we have large bulging vases (of the type styled *hu*) with movable lateral rings and inscriptions in Han style cast in high relief on the exterior of the bottom,[3]— of the same shape as the corresponding vases in bronze and pottery. There are, further, stoves, large cooking-kettles, cooking-pans, coin-moulds, bells, lamps, chisels, knives, and mountings for chariot wheel-naves,— in style and decoration breathing the spirit of Han culture, and the complete decomposition of the thick iron core testifying to their great antiquity. The cast-iron spears shown on Plate XXI, owing to the decay of the iron substance underground, have almost lost their original forms. The swords are in a somewhat better state of preservation. They are two-edged, like the older bronze prototypes, with massive iron hilts, but with lozenge-shaped guards of bronze coated with a dark and polished patina.

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[1] O. T. MASON, The Origins of Invention, p. 389.

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[1] Siberian Antiquities (*Materials toward the Archæology of Russia*, No. 5, in Russian, St. Petersburg, 1891).

[2] See the interesting observations of F. HIRTH (Chinesische Ansichten über Bronzetrommeln, pp. 18–22, and The Ancient History of China, pp. 234–237).

[3] It is the well-known formula *i hou wang* ("may it be serviceable to the lords!").

We are now confronted with the fact that the Han period has run through the same phase of development with regard to offensive and defensive armor. It is therefore inevitable to conclude that a correlation exists between these two developments, and that the production of defensive iron armor under the Posterior Han is prompted by the coeval coming into existence of iron weapons. The two phenomena are in mutual proportions. In the same manner, the perfection of bronze arms under the Anterior Han must have resulted in the machination of bronze protective armor. The same causes bring about the same effects; and if the agencies of the cause, the weapons, are suspected with good evidence of foreign origin, the same suspicion is equally ripe for the effects — defensive armor. The one is inconceivable without the other. In the ancient Siberian swords we meet the same process of development from bronze to iron as in ancient China, and this parallelism plainly reveals the historical interrelation of the two culture groups. This being the case, the further supposition is justifiable that also the progress made under the Han in body armor might be due to an impetus received from the same quarter. At this point due attention must be paid to the great historical connections linking all Asia in matters of military art. No human invention or activity can be properly understood if viewed merely as an isolated phenomenon, with utter disregard of the causal factors to which it is inextricably chained. Every cultural idea bears its distinct relation to a series of others, and this reciprocity and interdependence of phenomena must be visualized in determining its historical position. The development of harness must be viewed in close connection with the mode of military tactics, the science of warfare: every progressive step advanced in the latter draws a natural reaction on the form of armament, and a transformation of the latter is a sure sign of the fact that a considerable change in tactical conduct has preceded it. It is therefore from the history of tactics that we must derive our understanding of the technique of armor. The problem now set before us is,— What great movement in military tactics caused the radical transformation of arms experienced by the peoples of China, Central Asia, and Siberia around the centuries of our era? This movement, in my opinion, proceeded from ancient Irān. I shall endeavor to demonstrate that far-reaching tactical reforms were launched in Irān and deeply affected the entire ancient world, and that these innovations spread from Irān to the Turkish tribes of Central Asia, and were handed on by the latter to the Chinese. Developments of tactics and armature moved along very similar lines in the three groups.

First of all, attention should be called to the fact (and this cannot be an accident) that the new parts of the armor added in China during the Han period are exactly those which we find in ancient Persia. The nape-guard (*ya-kia*)[1] meets its counterpart in the *kūiris* named in the Avesta, rendered in the Pahlavī version *grīvpān* ("neck-guard") and explained by the gloss, "attached behind from the helmet to the corselet."[2] The Avesta mentions also leg-guards, *rānapānō* ("thigh-protector") which are interpreted as greaves; and according to JACKSON, the helmet is described in the Avesta as made of iron, brass, or gold.[3] Likewise the new mode of fighting prevailing in the Han period — the use of the sword in connection with shield and armor — is paralleled in Persia when we read in XENOPHON'S *Cyropædia* (II, 1, 21) that Cyrus, in training his men, relieved them from practice with the bow and the javelin, and exercised them in but one direction, to fight with sword, shield, and armor.[4]

Further, it is essential to grasp the fundamental fact of the difference between mounted archers and true cavalry, and the development of these two different arms and means of tactics among the Iranians. HERODOTUS (VII, 84) states that the Persian horsemen were equipped in the same manner as the infantry, except that some of them wore upon their heads devices wrought of brass and steel. Accordingly, the Persian cavalrymen of that time must be credited with the wearing of sleeved tunics of diverse colors, bedecked with breastplates of iron scales like fish-scales, as attributed by HERODOTUS (VII, 61) to the infantry. The description of Herodotus (IX, 49) leaves no doubt that the Persian horsemen fighting the Greeks were only a body of infantry mounted on horses and chiefly depending upon their bows, at which Herodotus expresses astonishment by remarking that, though horsemen, they used the bow; they were, accordingly, mounted archers.

This mode of fighting was spread over the entire Scythian and Iranian world. The Scythians shot with bow and arrow from horseback (HERODOTUS, IV, 131), and singly skirmished in open order against their opponents, attacking them here and there where chance or advantage offered; they were at the same time nowhere and ubiquitous, effectually screening their operations. The Massagetæ (HERODOTUS, I,

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[1] A Chinese word suspicious of foreign origin.

[2] A. V. W. JACKSON, Ancient Persian Armor (in *Classical Studies in Honor of Henry Drisler*, p. 118, New York, 1894).

[3] *Ibid.*, p. 119. The greaves are mentioned also by XENOPHON (*Anabasis*, VIII, 6); HERODOTUS (VII, 84) ascribes brass and steel helmets to the Persian cavalry men; XENOPHON (*Cyropædia*, VI, 1, 2) speaks of brazen helmets, and in one case (VI, 4, 2) of a golden helmet.

[4] Compare also *Cyropædia*, I, 2, 12.

215) were familiar with the mode of fighting both on horseback and on foot, which indicates that when in the saddle they were mounted footmen. The Parthian mounted archers were dreaded and detested by the Romans, chiefly because in taking to flight they shot their arrows backward at the pursuing enemy.[1] The Mongols, during their invasions, availed themselves of the same mode of tactics. "In battle they withdraw in good order, as soon as they are at a disadvantage," says the Armenian historian Haithon, "but it is very dangerous to pursue them, as, though turning back, they are able to shoot during the flight, and thus wound men and horses."

According to XENOPHON (*Anabasis*, VIII, 6, 7), there were around Cyrus about six hundred cavalry, the men all armed with breastplates, greaves, and helmets, except Cyrus, who presented himself for battle with his head unprotected;[2] and all the horses of the cavalry that were with Cyrus had defensive armor on the forehead and breast. Here, then, for the first time is the question of real cavalry; horse and man being completely armored, and this new equipment being a sign of a new mode of tactics, while in the age of Herodotus the horse of the Persians was not yet caparisoned.[3] Though the term "cataphracti" is not used by Xenophon, the institution described by him is either the forerunner of the latter or identical with them.

In *Cyropædia* (VI, 4, 1), besides the frontlets and breastplates of the horses, single horses with greaves, and chariot horses with plates upon their sides are mentioned; so that the whole army glittered with brass, and shone with purple garments. Abradatas equipped the horses of his chariot with brazen mail (*ibid.*, VI, 1, 51).[4] In the same work (VII, 1, 2) it is on record that all those who were with Cyrus were furnished with the same equipment as himself; purple coats, brazen armor, brazen helmets, white crests, short swords, and each with a spear made of the timber of the corneil-tree. Their horses were armed with brazen forehead-pieces, breastplates, and shoulder-pieces which simultaneously served as thigh-protectors to the rider. The rider allowed his feet to hang down behind these flank-pieces which safeguarded his thighs.

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[1] E. BULANDA, Bogen und Pfeil bei den Völkern des Altertums, p. 61 (Wien, 1913).

[2] On the armor of Cyrus see XENOPHON (*Cyropædia*, I, 4, 18; VII, 1, 2).

[3] The Massagetæ (HERODOTUS, I, 215), who in their costume and mode of living resembled the Scythians, had their horses caparisoned with breastplates of bronze, while gold was utilized for the bridles, the bit, and the cheekplates. The fact that the horses in the army of Xerxes were not caparisoned is practically demonstrated by the Nisæan charger of the Persian noble Masistius, which received an arrow in its flank (HERODOTUS, IX, 22). Neither were the horses of the Assyrians caparisoned, who possessed only mounted infantry, not cavalry in the strict sense.

[4] Compare also VI, 2, 17.

Finally, in his concluding chapter (VIII, 8, 22), in which Xenophon laments the gradual degeneracy of the Persians after the death of Cyrus, he sums up again by saying that Cyrus, after breaking them of the habit of skirmishing at a distance, armed with breastplates both men and their horses, gave every one a javelin in his hand, and trained them to close fighting; but now, the historian complains, they neither skirmish from a distance, nor do they engage hand in hand. In this passage it is clearly stated that Cyrus was the father of a new mode of tactics, and that this method was exactly what we understand by regular cavalry in the modern sense,— horsemen engaging in close combat, and charging their opponents with all possible speed by means of javelin, spear, lance, or sabre. The *Cyropædia*, of course, is nothing more than an historical romance, and the attribution to the elder Cyrus of the new tactical principle is plainly an anachronism; it must, however, have been in full operation among the Persians in Xenophon's time. It cannot have existed under Cyrus, as we do not find it in the army of Xerxes invading Greece.

The mail-clad warriors of the Persians and related nations became known in the antique world under the name cataphracti (*κατάφρακτοι*) or *catafractarii*, derived from *cataphracta*, the designation of their defensive armor. Sarmatians clad with such armor are represented on the Column of Trajan; actual fragments of armor of this sort discovered in graves of southern Russia, and, further, the notices of classical authors, enable us to form some idea of the appearance of these suits of armor.[1] They consisted of a foundation of cloth or leather, to which scales or laminæ of metal (copper or iron), more rarely of horn or bone, were sewed on in such a manner that the single rows overlapped, each row covering the upper part of the row immediately below. The result, accordingly, was a type of scale armor (*φολιδωτός*), the details in the arrangement of which naturally escape us. It was singularly flexible, provided with sleeves, and enveloping the entire body except that portion of the thighs which grips the horse. It was well adapted to the form of the trunk, and permitted the soldier ample freedom of motion. The horses likewise were completely armored with the same kind of scales, though they were frequently caparisoned with leather only (AMMIANUS, XXIV, 6),[2] as they were handicapped by the weight of the metal. The man had to be lifted on his horse. He was equipped with a long spear, which was supported by a chain attached to the horse's neck, and at the end by a fastening attached to the horse's thigh, so as to get the full force of the animal's weight into the spear-thrust.[1] At a given signal, the squadron composed of such horsemen dashed forth for the assault of the enemy, and was a formidable weapon against the infantry armed with bows, as the body protection rendered the horsemen arrow-proof. There were also cataphracti armed with bows, as follows from the figure of such a cavalier represented on the Column of Trajan, and shooting backward. It is clear that this troop could be efficient only as a united body and for the purpose of a surprise charge; when successfully repelled, the result must have been disastrous to the clumsy horsemen. The single ones were incapable of defending themselves; and we hear that the Gauls who accompanied the army of Crassus practised the stratagem of seizing their lances and pulling them off the horses. The difference in principle between the former mounted bodies of archers and this new system of cavalry is obvious: the mounted infantry soldier was an individual, and as such an independent fighting-unit, able and mobile on any occasion, be it charge, enduring battle, or pursuit; this troop did not advance at command in any regular alignments, but dispersed in open order, small bands suddenly sallying forth here and there, and as swiftly turning round, now attacking, then feigning flight, exhausting their opponents in pursuit, then rallying and pushing forward again till the contest was decided. The new cavalry troop was a machine set in motion by the will and word of a single commander. It was effective as long as the body preserved the agility of its members and worked with collective action as an undivided unit. Its success was bound up with the speed, security, and force of its assault; when the charge failed, its case was lost.

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[1] Compare the excellent article of E. SAGLIO in *Dictionnaire des antiquités grecs et romains*, Vol. I, p. 966.

[2] Operimentis scorteis equorum multitudine omni defensa.

When and by whom this new mode of tactics was invented is unknown. We have seen that it existed in Persia at the time of Xenophon, and the idea seems to have indeed originated among Iranians. Subsequently we find it in the army of Antiochus Epiphanes; and from the time of Antoninus Pius it became common in the armies of the Romans, soldiers of this description being frequently mentioned in inscriptions of that period. Thus we see the Romans adopt the strategy of their adversaries,— a bit of history which, as we shall see presently, repeats itself in China. The Iranian mode of strategy with the peculiar body armor for man and horse spread likewise to the Scythians (see p. 220), and to Siberia as far as the Yenisei, as witnessed by the famed petroglyph of a mounted lancer equipped with plate mail. This horseman indeed represents a *cataphractus* (Fig. 35). This monument may be roughly dated in the time of the Siberian iron age, and is surely coeval with the period of Chinese-Turkish relations in the epoch of the Han.

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[1] SMITH, WAYTE, and MARINDIN, Dictionary of Greek and Roman Antiquities, 3d ed. (Vol. I, p. 384).

In fact, the Turkish tribes who fought the Chinese at that time had undergone a similar development from the primitive and crude warfare of mounted archers to the principle of organized cavalry, like their Iranian neighbors; and the Turks, on their part, were duly seconded in this respect by the Chinese. We know surely enough that the primeval Chinese did not possess cavalry, and that their battles were fought by soldiers on foot or in war-chariots (p. 185). We know, further, that the tactics of mounted infantry archers, in imitation of Turkish practice, were first organized in China by King Wu-ling (B.C. 325–299) of Chao; that he introduced the narrow-waisted and tight-fitting barbaric costume among his subjects, and taught them shooting with the bow while on horseback.[1] Regular cavalry, we see, came up in China from under the Anterior Han, and this was still less a truly Chinese idea than the mounted infantry. It was adopted from the Huns; and the Huns, I venture to assert, — though this impression cannot be supported at present by a literary document,— had learned this lesson from Iranians. There is no escape from the conclusion that historical contact and derivation must have been in operation, for it would be against all

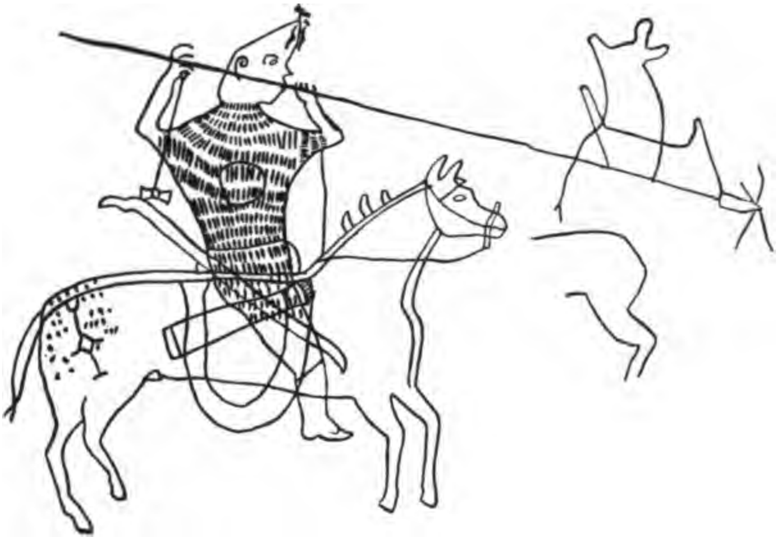

FIG. 35.
Mounted Lancer Clad with Plate Mail, Rock-Carving on the Yenisei, Siberia (from Inscriptions de l'Iénissei, Helsingfors, 1889).

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[1] See the writer's Chinese Pottery, p. 216.

reason to assume that both the Huns and the Chinese should independently have run through the same stages of development of a complex series of phenomena as the Iranians did several centuries before this period. The inward identity of these developments on the three sides, resulting in the same styles of body armor improved by the utilization of metal, and the same manner of fighting, is sufficient proof for the fact that the one nation successively adopted the new practice from the other.

It would be beyond the scope of the present investigation to enter into the details of the history of this military institution in China. China's military history has been much neglected, though it offers a wide field for studies of great culture-historical interest. Among these, a research into the subject of cavalry is worthy of special consideration. A few suggestive remarks may here be offered.[1]

The Huns, the Hiung-nu of the Chinese Annals, were born fighters, tribes of horsemen, and expert archers. According to the picture of their life drawn by Se-ma Ts'ien,[2] they taught their children to practise riding on the backs of sheep, and to shoot birds and rodents with bow and arrow. Qualification in archery made the soldier, "and every soldier strong enough to bend a bow was a cuirassed horseman."[3] This plainly indicates that the soldiery of the Huns consisted of mounted archers fighting in open order and individually, like the Scythians; and the historian further adds that their offensive weapon for distant fighting was the bow and arrow,[4] while in close combat they employed swords and short spears. Whether they engaged also in dismounted combat, we do not know. When Se-ma Ts'ien adds that they were not ashamed of flight, this is duly connected with their mode of fighting, as set forth above (p. 218) in regard to Iranians and Scythians:[5] their flight was a sham-flight to deceive and exhaust their opponents, and they did not fail during this manœuvre of retreat to send their arrows backward. Their cuirass (*kia*) was of leather obtained from the skins of their domestic animals, from which also their ordinary clothing was prepared; in addition to leather garments, they had coats of felt.

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[1] An interesting work giving a digest of the military affairs of the Han dynasty is the *Pu Han ping chi* (reprinted in *Chi pu tsu chai ts'ung shu*).

[2] *Shi ki*, Ch. 110, p. 1 b.

[3] Thus in the translation of E. H. PARKER (*China Review*, Vol. XX, p. 1), which seems to me exact. HIRTH (Ancient History of China, p. 168) translates, "Having grown to become soldiers, they would thus become excellent archers, when they were all supplied with armor on horseback." This, though generally rendering the sense of the passage, is hardly in Se-ma Ts'ien's text; at any rate, the words *kia ki* cannot be separated, but form a technical term, "a horseman clad with hide armor." The word *kia* in Se-ma Ts'ien invariably refers to hide armor or cuirass, not to metal armor, which is *k'ai*.

[4] As swift and mounted archers the Huns appeared in Europe (motibus expediti, et ad equitandum promptissimi: scapulis latis, et ad arcus sagittasque parati. JORNANDES, XXIV), as did the Mongols at a later date.

[5] MARCO POLO (ed. of YULE and CORDIER, Vol. I, p. 262) very aptly says in regard to the Mongols, "As they do not count it any shame to run away in battle, they will sometimes pretend to do so, and in running away they turn in the saddle and shoot hard and strong at the foe, and in this way make great havoc. Their horses are trained so perfectly that they will double hither and thither, just like a dog, in

The re-organizer of the military power of the Huns was the famed Moduk[1] (Mau-tun), who at the end of the third century B.C. welded the scattered tribes into a compact unit. Moduk was the son of the Shan-yü[2] T'ou-man, who afterwards had a younger son by a favorite consort. Wishing to disinherit Moduk, and to place this younger son on the throne, he sent Moduk as hostage to the old enemies of the Huns, the Yüe-chi (Indoscythians), and then went on the war-path against the latter. Moduk, his life being thus imperilled, thought of his safety, and, stealing one of the swiftest horses of the Yüe-chi, fled homeward. His father, who thought this was an heroic deed, placed him in command of ten thousand horsemen. The ambitious Moduk then plotted against his father's life and throne. The Chinese historian Se-ma Ts'ien[3] narrates the story of how he achieved his scheme, in a highly anecdotal form, from which important events are apparently omitted. The story is that Moduk, making sounding arrows,[4] trained his equestrian

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a way that is quite astonishing. Thus they fight to as good purpose in running away as if they stood and faced the enemy, because of the vast volleys of arrows that they shoot in this way, turning round upon their pursuers, who are fancying that they have won the battle. But when the Tartars see that they have killed and wounded a good many horses and men, they wheel round bodily, and return to the charge in perfect order and with loud cries, and in a very short time the enemy are routed. . . . And you perceive that it is just when the enemy sees them run, and imagines that he has gained the battle, that he has in reality lost it, for the Tartars wheel round in a moment when they judge the right time has come. And after this fashion they have won many a fight." This picture holds good as well of the Scythians, Huns, and T'u-küe. From the numerous representations of the mounted archer shooting backward on the relief bands of the Han pottery we see how deeply impressed the Chinese were by this feat of military skill.

[1] This is the correct Turkish restoration of the name, as based on the data of the Chinese commentators, according to O. FRANKE (Beiträge aus chinesischen Quellen zur Kenntnis der Türkvölker und Skythen Zentralasiens, *Abhandlungen der preussischen Akademie*, 1904, p. 10). He reigned B.C. 201 to 177.

[2] Title of the sovereigns of the Huns. Compare Plate XXII for a Chinese pictorial representation of one of the Shan-yü.

[3] *Shi ki*, Ch. 110, p. 3 b. Compare A. WYLIE, History of the Heung-noo in their Relations with China (*Journal of the Anthropological Institute*, Vol. III, 1874, p. 408); E. H. PARKER, The Turco-Scythian Tribes (*China Review*, Vol. XX, p. 7); and F. HIRTH (Sinologische Beiträge zur Geschichte der Türk-Völker, p. 254, St. Petersburg, 1900), who very well characterizes Moduk as a hero.

[4] He did not invent them, as Wylie translates. Also GILES (No. 10,928; *ming ti*) states that the sounding arrows were "invented by Mao-tun or Meghder" (similarly PALLADIUS, Vol. I, p. 174). ASTON (Nihongi, Vol. I, p. 87) makes Parker say that the sounding arrows are not Chinese, but an invention of the Huns; but PARKER (*China Review*, Vol. XX, p. 7), referring to the *nari-kabura* of the ancient Japanese, observes only that the latter seem to have imitated the Huns. In my opinion it is

archers in shooting with them. An order was issued by him to the effect that all his men, at whatever goal he should discharge a sounding

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begging the question to speak in this case of an invention of Moduk, or of a Hunnic invention, or of invention at all; for such a contrivance is not an invention creditable to an individual or a single tribe. It represents the result of a gradual finding and experimenting, the how, when, and where of which is lost. All we may safely assert is that chronologically we first meet these buzzing arrows among the Huns, — and the text of the *Shi ki* contains the oldest record of them, — and that numerous archæological finds made in central and western Siberia testify to the fact that this type of arrow was formerly generally diffused among the Turkish stock of peoples (compare B. ADLER, Pfeifende Pfeile und Pfeilspitzen in Sibirien, *Globus*, Vol. 81, 1902, pp. 94–96; this brief notice is purely descriptive, without an historical point of view). Moduk did not invent the sounding arrow, which surely existed before his time, and which was used by his countrymen for hunting purposes; but he turned it to a novel use by availing himself of the whizzing noise as a signal for a cavalry attack. With this specific end in view he had such arrows "made," as the Chinese text says, which implies that they were previously known. HIRTH (*l. c.*, p. 254, note) has justly doubted whether Moduk may be regarded as the "inventor" of the sounding arrow, since a similar expression (*kao shi*, No. 3872, "sounding arrows, discharged by bandits as a signal to begin the attack") is metaphorically employed by the philosopher Chuang-tse of the fourth century B.C. But the *ming ti* of Moduk must have been affairs somewhat different from the latter, otherwise we should not have the two different terms. There are indeed (and the ethnographical point of view should never be neglected) diverse types of sounding arrows in our collections. An arrow can be made "sounding" by merely having one or several perforations in the iron blade; and the humming is essentially intensified by a special whistling apparatus inserted between shaft and head. This device is an oval-shaped knob of wood or bone, perforated like a whistle with two, four, or more holes, on which the wind plays when the arrow sharply cuts the air. I venture to presume that the sounding arrow mentioned by Chuang-tse belonged to the first of these types, and that of Moduk to the second; the interpretation given by Ying Shao (*Shi ki*, Ch. 110, p. 3 b) of the term *ming ti* leaves no doubt as to this fact. Again in the Chinese Annals we hear of sounding arrows being in the possession of the T'u-küe or Turks (for instance, *Chou shu*, Ch. 50, p. 3; *Pei shi*, Ch. 99, p. 2; and JULIEN, Documents historiques sur les Tou-kioue, p. 9). A new term appears in the Annals of the T'ang Dynasty (*T'ang shu*, Ch. 39, p. 9), — *hiao* arrows (*hiao shi*). The word *hiao*, not listed in any of our dictionaries, is written with a character composed of the classifier 'bone' (*ku*) and the phonetic element *hiao* ('filial piety'). This reading is indicated in the Glossary of the T'ang Annals (Ch. 4, p. 2 b) where the word is explained by the older term *ming ti* ("sounding arrow"). The manner of writing the word indicates that the question is here of arrows with a whistling contrivance carved from bone. These arrows, according to *T'ang shu*, were sent as tribute from the district Kuei-ch'uan in Kuei chou, now the prefecture of Süan-hua in Chi-li Province (PLAYFAIR, Cities and Towns of China, 2d ed., No. 7363). Sounding bone arrows, accordingly, were made and used in China during the T'ang period; and in coming to Japan, we need not invoke the Huns, but are confronted with the plain fact of an idea directly imported from China. The *Kōjiki* of 712 A.D. (B. H. CHAMBERLAIN'S translation, p. 72) relates that "the Impetuous-Male-Deity shot a whizzing barb into the middle of a large moor, and sent him [the Great Deity] to fetch the arrow, and when he had entered the moor, at once set fire to the moor all round." The text employs the same characters for the word as *Shi ki* and *Ts'ien Han shu* (Ch. 94 A, p. 2 b: *ming ti*), but they receive the Japanese reading *nari-kabura* (literally, 'singing turnip'). CHAMBERLAIN, in the introduction to his translation of the Kōjiki (p. LXIX), justly emphasizes that this peculiar kind of arrow belongs to the traces of Chinese influence on the material culture of old Japan (Japanese illustrations in PH. F. v. SIEBOLD, Nippon, 2d ed., Vol. I, p. 342, and G. MUELLER-BEECK, *Mitteilungen der deutschen Ges. Ostasiens*, Vol. IV, p. 3, Plates 5 and 6). In the *Nihongi* of 720, a sounding arrow with eight eyes or holes is mentioned (ASTON, Nihongi, Vol. I, p. 87; K. FLORENZ, Japanische Mythologie, p. 206). Reverting to China, we have for the Mongol period Rubruck's account to the effect that Mangu made a very strong bow which two men could arrow, should aim at the same, under penalty of decapitation. To ascertain how far his followers might be relied upon, he speedily put them to the test. Taking the sounding arrow, he aimed at his favorite horse, when some of his attendants hesitated to follow his example, and were decapitated on the spot. A sterner test was soon in store: his attendants stood aghast at seeing the sounding arrow fly at his cherished wife; those fearing to comply with the order were at once beheaded. Afterwards he went ahunting and discharged the sounding arrow at King T'ou-man's favorite horse; his men without exception duly followed suit: thus Moduk knew that his adherents could be trusted, and finally resolved on the accomplishment of his grand *coup d'état*. While on a hunting-expedition with his father, he seized a favorable opportunity to let a sounding arrow fly at the Shan-yü, whereupon a volley was fired at him by his adherents. The king fell; and his death was followed by the massacre of his wives (except Moduk's own mother), his youngest son, and all officers of state who refused allegiance to the victor. Moduk set himself up as Shan-yü in B.C. 201.[1]

There is assuredly the fact of a large political movement at the bottom of this narrative. Certainly, there was no need of a brigade or two of cavalry to eliminate the person of the king; it was a wrestle for the kingdom which involved a contest with a huge army. The problem confronting Moduk was how to overrun the king's powerful host. At this point his reform set in: he became the drill-master of his equestrian archers and a prominent cavalry tactician. His task was beset with

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hardly string, and two arrows with silver heads full of holes, which whistled like a pipe when they were shot; Mangu sent these as a symbolic gift to the King of the Franks (W. W. ROCKHILL, The Journey of William of Rubruck, p. 180). As to the Ming period, these arrows are figured in the *Wu pei chi* of Mao Yüan-i of 1621 (Ch. 102, p. 10). Those used in the army under the Manchu dynasty are illustrated and described in the *Huang ch'ao li k'i t'u shi* (Ch. 14). They exhibit a great number of types and varieties which require a special study; in principle, there are two chief classes,—arrows with sharp iron points stuck into the whistle; and arrows with whistle, but without any iron point. The latter do not serve the purpose of killing, but of making only a certain impression. The Kalmuk of the eighteenth century availed themselves of whizzing arrows in hawk-hunting. When the water-fowl frightened by birds of prey would not rise, it was roused by means of such arrows provided with a bone knob, but without iron; for the fowl should not be slain while in the water (P. S. PALLAS, Sammlungen, Vol. I, p. 147). Such blunt sounding arrows were used till the end of the Manchu dynasty by the imperial body-guards to frighten obtrusive people when the emperor was driving out. Wounds from this weapon, if any, were of course harmless. This type of arrow is styled *pao* (E. v. ZACH, Lexicographische Beiträge, Vol. I, p. 50); it is not, however, as v. Zach explains, merely the bone knob which is so called, but the entire implement. The bone knob is termed *ku pao*. The word *pao* first appears in the *T'ang leu tien* (the "Six Statutes of the T'ang Dynasty") in the sense of a bone arrowhead. At one time, sounding arrows were used in old England, the arrowheads being perforated (J. STRUTT, Sports and Pastimes of the People of England, p. 127).

[1] This is the date given by M. TCHANG (Synchronismes chinois, p. 118). WYLIE gives the date as B.C. 209.

grave difficulties; to break the former deep-rooted habit of irregular fighting on the part of these wild hordes, and to train them to the word of one chief commander, required a master's mind and an iron will-power. Men always wont to unrestricted freedom in the discharge of their weapons, and almost unconstrained as to their movements and operations on the battle-field, were now forced to absolute subjection under the command of the chief, and compelled to fire volleys strictly at his signal, — a genuine cavalry feat.

Speaking *cum grano salis*, Moduk did the same as Cyrus in Xenophon's *Cyropædia*, or Maurice of Nassau when in the war of independence of the Netherlands (1568–1609) he drilled his German mercenaries, who were more lightly armed and mounted than their Spanish opponents, to form in two or three lines, to move rapidly, and to make direct charges while firing their pistols at the enemy. Moduk's method of drilling naturally presupposes an orderly array of his troops in rigorous alignments. The revolutionary character of his innovation, which was a source of amazement to his countrymen, is indicated by the gradual exercises and tests, and the severe punishments meted out to the negligent ones. His military genius is illustrated by the fact that he conceived the bold plan of introducing a radically new mode of tactics, that of organized and compact cavalry, in order to overthrow his father's irregular horsemen. He opposed the art and strategy of war to natural belligerents, the principles of cavalry attacks to unprincipled savage warfare. Was Moduk himself the inventor of this new science of tactics? This can hardly be presumed. We remember that he lived as a hostage among the Yüe-chi. This, of course, was at a time when the Yüe-chi still occupied their seats in the northern part of Kan-su; their westerly migration took place in B.C. 165. Maybe he learned military lessons from the Yüe-chi. The facts, at all events, prove that he had the spirit and nerve of Cyrus in him. The Iranian standard is clearly demonstrated in his doings. In the same manner as Iranian cavalry practice was adopted by the Romans, it deeply influenced the Turkish tribes; and Moduk was the prominent leader and organizer of this reform.

In reading carefully the battles fought by the Huns against the Chinese, we recognize, despite their meagre and incomplete descriptions, that the Huns were most expert cavalry tacticians, who fully practised the rules laid down by Frederick the Great after the lesson which he received from the Austrians at the battle of Mollwitz,— "Every officer of cavalry must ever bear in mind that there are but two things required to beat the enemy: first, to charge him with the greatest possible speed and force; and second, to outflank him." Hunnic skill in manœuvres of the latter sort[1] and their ability for making the best of the field of operations or any accident of territory, are especially notable in the fierce struggle against the army of Li Ling. On outpost and scouting duty they were unsurpassed. The manner in which Moduk in an unusually cold winter forced the army of the first Han Emperor, 320,000 men, mostly infantry, into a siege, enticing it on by feigning defeat and flight and keeping his best forces in ambush, is a feat worthy of this military genius. It is a deplorable loss that the details of this unique campaign have not been recorded accurately.[2]

A "battle of the Huns" is preserved on the stone monuments of the Hiao-t'ang-shan.[3] There we see them galloping on their sturdy ponies, and shooting with bow and arrow. Others are equipped with long halberds, and show us that the Huns charged in the same manner as the cataphracti. One horseman makes an attempt to drag another out of the saddle by means of a long lance with presumably hooked point.[4] A dismounted warrior, clad with a cuirass and with sword in hand, is engaged in cutting off heads. Also some of the mounted archers have donned an armor. Reserves waiting in ambush are kept in the background, shielded behind hilly ground or artificially thrown-up intrenchments.[5] The king of the barbarians is seated in front, giving instructions to a man kneeling before him.

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[1] It is interesting that there is a Turkish word for this manœuvre, *tulghama*. This practice was introduced by Bāber into India, and is described in his Memoirs (Pavet de Courteille, Bāber nameh, Vol. I, p. 194, and P. Horn, Das Heer- und Kriegswesen der Grossmoghuls, p. 22, Leiden, 1894). The cavalry of the Moghuls, consisting of armored lancers mounted on caparisoned horses, certainly is an offshoot of the ancient cataphracti.

[2] A great setback to the study of military matters is the lack in the Chinese annals of any descriptions of battles, such as we have in the classical authors. The annalists are usually content to state the figures of the respective armies, the names of the commanders, date and locality of the battle, and its final dry net result with the quota of the slain and captives; but nothing, as a rule, is given out concerning the military operations in the course of the battle. Only in the biographies of the prominent generals of the Han period do we occasionally encounter a somewhat detailed record of the military evolutions of a combat, though these also are sadly deficient and pass over in silence what we are most anxious to learn. The Confucian scholar never was interested in the military side of the events.

[3] Chavannes, Mission, No. 47, and La sculpture, p. 82. In a poem of the first century A.D. by Wang Yen-shên, descriptive of a palace in K'ü-fu, the home of Confucius, are mentioned representations of people from Central Asia (*Hu jên*) depicted in a group on the upper parts of the pillars. They were outlined kneeling in a reverential attitude opposite one another. "There they remained unmoved with their long and narrow heads and their eyes in a fixed gaze like that of a bustard (*tiao*). Over their lofty noses and deep eyes they lifted their highly arched eyebrows. They looked sad as if in danger" (J. Edkins, in *Chinese Recorder*, Vol. XV, 1884, p. 345).

[4] Such lances are illustrated in *Wu pei chi* and other Chinese works concerning military matters.

[5] M. Chavannes (*l. c.*) conceives them as going out of tents. This point of view is possible, but the opinion as given above seems to be preferable. The outlines here in question have hardly any resemblance to tents.

It must certainly be granted, as justly emphasized by CHAVANNES,[1] that the Huns were initiated also into the more "scientific" strategy of the Chinese by those Chinese generals who, from fear of being cashiered and court-martialled at home as a sequel of their defeats, preferred surrender to the enemy. The brave General Li Ling, who was forced to surrender to the Huns, is reported to have trained their soldiers in the art of war as then practised by the Chinese; the Emperor, on hearing these tidings, condemned him as a traitor, and caused his mother, wife, and children to be put to death.[2]

HIRTH,[3] in balancing the advantages and shortcomings of Hunnic and Chinese warfare, thinks that the Chinese have had on their side greatly superior armament and a certain uniformity of organization. The latter observation is doubtless to the point, but I hardly believe that Chinese arms were superior in technique to those of the Huns: the ancient bronze and iron arms discovered in Siberian soil are surely as good as any of ancient China. Possibly the crossbow, which was foreign to the Huns, rendered the Chinese superior in some respect.

The military equipment and organization of the Han, compared with that of the Chou, show a number of fundamental changes which are simultaneously symptoms of radical reforms in the manner of tactics and strategy. The main features of these innovations are the great importance attributed to the horse, — as the renowned General Ma Yüan put it, "the horse is the foundation of all military operations,"[4] — the preponderance of horsemen over infantry, the prevalence of the crossbow over the bow, the use of body armor on the part of the horsemen, and the gradual development of a genuine and regular cavalry. The immediate cause of these military reforms was brought about by the endless struggles with the ever-restless nomadic hordes threatening the north-western outskirts of the empire; and imitation of their mode of warfare consequently became imperative. The wearing of armor by the horsemen, as we noticed, was a custom of the Huns; and if the Chinese followed suit, we may well lay it down as an adoption of Hunnic practice. This is not merely an impression in the matter, but a fact confirmed by the report of Ch'ao Ts'o presented to the throne in B.C. 169.[5] In this lengthy memorial the diversity of Hunnic and Chinese warfare is set forth in detail; and for the first time the formation of a corps of chevaulégers (*king ki*)[1] is recommended, as the heavy infantry and war-chariots of the Chinese were powerless against the Huns. He further advised employing the tactics of the Huns against the Huns, and hiring mercenaries of the horde I-k'ü for this purpose; while within the boundaries of the empire the Chinese army should continue with the Chinese mode of tactics. This suggestion was not carried out immediately, but we see it brought into effect under the Emperor Wu (B.C. 140–87), who may be regarded as the reformer of Chinese cavalry. The man who really achieved the work and infused new life into the cavalry arm was General Ho K'iü-ping, who completely abandoned the traditional ground of Chinese tactics, and put the institution of chevaulégers into practice.[2] As a youth of eighteen he was an accomplished horseman and archer, and at the head of a squadron of eight hundred chevaulégers, forming the advance-guard of the army, gained laurels against the Huns. In B.C. 121, when only twenty years of age, he was appointed commander-in-chief of the entire force of chevaulégers, and defeated the Huns in six consecutive battles.[3] His common sense is shown by the fact that he positively refused to study Sun Wu's "Art of War," and preferred to trust to his own judgment. This doubtless means that he was a practical man who rejected theories, and by long experience had grasped the warfare of his adversary and appropriated the latter's method as the most promising one. His victories over the Huns are due to the tactics of cavalry which he adopted, while his predecessors under the early Han emperors prior to Wu met with disastrous failures by opposing infantry to the horses of the enemy. Surely the Chinese had bought their experience at a high price.

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[1] Les Mémoires historiques de Se-ma Ts'ien, Vol. I, p. LXIX.

[2] GILES, Biographical Dictionary, p. 450.

[3] Ancient History of China, p. 166.

[4] *Hou Han shu*, Ch. 54, p. 9.

[5] L. WIEGER, Textes historiques, p. 414.

Cavalry thus grew during the Han period into an independent arm, and finally was the most important one in the wars against the roving tribes of Central Asia. The cavalry had its own organization and administrative powers. As shown by a passage in a memorial presented by Huai-nan-tse to the Han Emperor Wu, there were then four officially recognized main bodies of troops,—war-chariots, cavalry, archers, and arbalists.[1]

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[1] Or *p'iao ki* (No. 9134), "fleet cavaliers" (see CHAVANNES, Les Mémoires historiques de Se-ma Ts'ien, Vol. III, p. 559), apparently translation of Turkish *čapkunči* (P. HORN, Das Heer- und Kriegswesen der Grossmoghuls, p. 21, and W. RADLOFF, Wörterbuch der Türk-Dialecte, Vol. III, col. 1922).

[2] A repetition of this spectacle took place in Europe when it suffered in the tenth century from the inroads of the Hungarians, until Henry I of Germany, by adopting the cavalry methods of the enemy, finally succeeded in repelling him. Again, in the thirteenth century, the light horsemen of the Mongols and Saracens got the better of the iron-clad cavalry of central Europe. Only the German Order of Prussia then possessed enough military acumen to form an excellent light cavalry under the designation "Turcopoles" placed at the command of a "Turcopole," which rendered good services against Lithuanians and Poles (M. JÄHNS, Ross und Reiter, Vol. II, p. 86).

[3] His biography is in *Shi ki* (Ch. 111) and *Ts'ien Han shu* (Ch. 50). It has been translated by A. PFIZMAIER (*Sitzungsberichte Wiener Akademie*, 1864, pp. 152–170); see also GILES, Biographical Dictionary, p. 260.

The new order of military affairs is especially expressed by the new military offices instituted by the same Emperor. The high significance which the tactics of cavalry must have reached in his time is very conspicuous in these functions. He established a commander of cavalry (*tun ki hiao wei*), a commander of the squadrons of foreign cavalry (*yüe ki hiao wei*) formed by the men of the country of Yüe subjected to China, a commander of the squadrons of foreign cavalry (*ch'ang shui hiao wei*) formed by the Turks or Huns (*Hu*) of Ch'ang-shui and Süan-ho, and a commander of the Turkish or Hunnic cavalry (*hu ki hiao wei*) stationed at Ch'i-yang.[2] In this institution of Turkish cavalry[3] incorporated with the Chinese army we may recognize a positive sign of the fact that the Chinese had borrowed the whole affair from their Turkish neighbors, and utilized against them their own tactical stratagems. Also in the military colonies founded by the Emperor Wu in Turkistan to break the power of the Turks, detachments of cavalry were established.[4]

The perpetual wars with the turbulent nomads required an immense number of horses. "In view of his campaigns against the barbarians of the north, the Son of Heaven maintained a large number of horses, several myriads of which were reared in the capital Ch'ang-ngan," relates Se-ma Ts'ien.[5] "In B.C. 119, the commander-in-chief and the general of the chevaulégers made a great incursion to attack the barbarians of the north; they took from eighty to ninety thousand captives. Five hundred thousand pounds of gold were distributed as reward. The Chinese army had lost over a hundred thousand horses. We do not here render an account of the expenses incurred by the land and water transportation, the chariots and cuirasses."[6] Here, accordingly, is the question of cavaliers wearing cuirasses.

The generals of the Han dynasty were all clad with armor and mounted on horseback. When in 48 A.D. General Liu Shang was badly defeated by the *Man* barbarians, General Ma Yüan, who had formerly gained laurels in their pacification, turned in a petition asking to be placed in service again. As he was in his sixty-second year, however, the Emperor declined his offer in view of his advanced age. Ma Yüan then made a personal appeal to him, saying, "Your servant is still able to sit in the saddle with the armor on his body." The Emperor demanded the experiment, whereupon the aged soldier flung himself into the saddle and daringly looked around, in order to demonstrate that he was still of use. The Emperor, filled with admiration, entrusted him with the command.[1] It is on record that General Kêng Ping, who died in 91 A.D., was always at the head of his troops, enveloped with his armor and mounted on horseback.[2] There is thus sufficient evidence at hand that the Chinese derived their whole system of cavalry from the Huns, both cavalry tactics and cavalry equipment; and there can be no doubt of the fact that the Chinese made exactly the same use of cavalry as the Huns.[3] Thus the Iranian ideas have filtered through the Huns into the Chinese. For this reason it is most likely also that the new cuirasses bedecked with copper and iron laminæ, coming up in China during the epoch of the Han, received their impetus from the west, more specifically from the metal scale and plate armors worn by the Iranian and Scythian cataphracti.

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[1] L. WIEGER, Textes historiques, p. 506.

[2] Compare CHAVANNES, Les Mémoires historiques de Se-ma Ts'ien, Vol. II, pp. 525, 526.

[3] The Tibetans (K'iang) also were recruited by the Chinese to form regiments of cavalry (CHAVANNES, *T'oung Pao*, 1906, p. 256).

[4] See E. BIOT, Mémoire sur les colonies militaires et agricoles des Chinois (*Journal asiatique*, 1850, pp. 342, 344, 345).

[5] CHAVANNES, Les Mémoires historiques de Se-ma Ts'ien, Vol. III, p. 561.

[6] *Ibid.*, p. 569.

As said before, the history of cavalry development in China (and that of military art in general) remains to be written. An interesting observation may still be added here. Under the Sui and T'ang, the light cavalry, apparently the inheritance of the institution of the Han, was in full operation, particularly in the campaigns against the Turkish tribes. It seems, however, that the method of cavalry charges, as established by the Han after Hunnic example, had subsequently fallen into oblivion; for we are informed from the interesting biography of Yang Su inserted in the Annals of the Sui Dynasty[4] that this daring commander was obliged to inaugurate again a reform of cavalry tactics. In 598 A.D. the Turkish Khan Ta-t'ou, the Tardu of the Byzantine historians, made an inroad into China; and Yang Su, appointed generalissimo against him, met with unusual success. Formerly, the Chinese annalist tells us on this occasion, the generals in their battles with the Turkish hordes were chiefly concerned about the cavalry of the enemy, and merely observed an attitude of defence by forming a carré of chariots, infantry and riders, the latter being posted in the centre surrounded by the other troops, and the carré being encircled by an abatis.[1] Yang Su held that this means of defence was merely an act of fortifying one's self, but could never lead to a victory; and he entirely abandoned this old-fashioned practice. He formed his troops solely into squadrons of horsemen ready for immediate attack. On learning these tidings, the Khan was overjoyed, exclaiming, "Heaven has accorded me this favor!" Dismounting from his horse, he looked up to Heaven and worshipped. At the head of a hundred thousand picked equestrians he advanced, and suffered a distressing defeat from the hand of Yang Su, who charged him with all vehemence. Fortunately we are told also some details as to the method of Yang Su's offensive procedure. He was a harsh warrior, enforcing martial laws with Spartan severity: capital punishment was meted out to whomever infringed the articles of war. In open battle he began operations by rushing one or two hundred riders against the position of the enemy. Did they succeed in breaking him, it was all right; did they fail and retreat, he had all of them, irrespective of their number, beheaded on the spot. Then he proceeded to send forth a squadron of two to three hundred men, until the enemy was beaten. Thus his officers and men were overwhelmed with awe, and "possessed of a heart ready to die." From this time, Yang Su remained victorious in every combat, and reaped the fame of a remarkable commander.[2]

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[1] *Hou Han shu*, Ch. 54, p. 12 b; HIRTH, Chinesische Ansichten über Bronzetrommeln, p. 60.

[2] CHAVANNES, *T'oung Pao*, 1907, pp. 223, 224.

[3] A good example of the employment of cavalry for reconnoitring is furnished in B.C. 152 by the feat of Li Kuang, who went out with a guard of a hundred horsemen and suddenly saw himself confronted by a cavalry corps of several thousand Huns. He advanced to make them believe that he represented the vanguard of a large force following. At a short distance from the enemy he gave orders to dismount and to unsaddle, in order to show that he had no mind to retreat. A captain of the Huns sallies out; Li Kuang and ten of his men jump on their horses, and fell him with an arrow-shot. He turns back, unsaddles again, and orders his soldiers to graze the horses, and to take a rest. Until the evening the distrustful Huns durst make no charge. Under cover of night, the Chinese retreated in good order. The interesting biography of Li Kuang has been translated by A. PFIZMAIER (*Sitzungsberichte Wiener Akademie*, 1863, pp. 512–528).

[4] *Sui shu*, Ch. 48, pp. 1–6. According to GILES (Biographical Dictionary, p. 914) Yang Su died in 606 A.D.

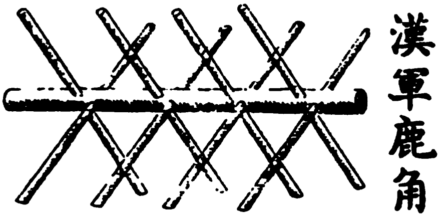

Fig. 36.
Abatis (from *Huang ch'ao li k'i t'u shi*).

When I make the armament of the Iranian and Scythian cataphracti responsible for the appearance of metal armor in China, and when I am inclined to trace the perfection in the organization of the cavalry among the Huns and Chinese to a movement issuing from Iranian quarters, it should be pointed out, on the other hand, that the cataphracti do not seem to have exerted any directly imitative influence on Huns and Chinese, or that these two nations did not absolutely copy or adopt in all particulars this peculiar mode of warfare. At least, there is no direct documentary testimony to this effect, save the rock-carved lancer on the Yenisei (Fig. 35), which thus far represents an isolated case. The "battle of the Huns" above referred to displays Central-Asiatic horsemen armed with long halberds amidst equestrian archers, and could possibly be invoked as attesting, on the part of the Huns, cavalry charges in the manner of the cataphracti. In the Chinese Annals, however, as far as I know, no instance of a charge of horsemen with spears,[1] on the part of either the Chinese or the Huns, is on record; nor do I find any mention of armored horses in the Han period. The earliest palpable evidence for an armored warrior astride a caparisoned horse is represented by a clay figure pointing to the T'ang epoch.[2] Several references in the Annals allude to such caparison in the sixth and seventh centuries of our era. As the facts are, neither the Huns nor the Chinese could have had any use for the more specific tactics of the cataphracti. These were directed against heavy-armed infantry lined up in regular files. The Huns did not possess any infantry; and the Chinese employed theirs against the Huns only in the experimental stage of their operations, and with such disastrous results that it deterred them from further experiments. On the whole, Hunnic-Chinese expeditions were cavalry wars conducted with light brigades. The long marches, the wretched roads, the difficulty of the field of operations, the uncertainty of supplies and forage, and the exhausting Central-Asiatic climate, formed a serious handicap in the equipment of troops, man and horse, with heavy armament; so that a selective method in what western progress in the art of war had to offer became indispensable.

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[1] In Chinese *lu kio* ("stag horns"). Every visitor to China has seen these affairs in front of Yamen and police stations. The illustration (Fig. 36) is derived from *Huang ch'ao li k'i t'u shi* (Ch. 15, p. 26). These abatis are first mentioned in the life of Sü Huang (*San kuo chi*, *Wei chi*, Ch. 17, p. 6), then in the life of Ma Lung (*Tsin shu*, Ch. 57, p. 2 b), who made extensive use of this means of defence in open territory.

[2] *Sui shu*, Ch. 48, p. 3.

In the Ming period mail-clad cavaliers managing lances and war-clubs were in existence, as attested by an illustration in the *Lien ping shi ki*[1] (Fig. 37). As this recent epoch lacked any inventiveness in military matters and merely continued the institutions of the T'ang, Sung, and Yüan, it can hardly be credited with the feat of having originated mounted lancers; for the present, however, I am unable to say exactly at what date this arm sprang up in China.

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[1] Spears are not mentioned in the Han documents translated by M. Chavannes, but the conclusion would not be warranted that they were then not used by the Chinese army. The renowned General Li Ling, who in B.C. 99 advanced into the territory of the Huns with a small army of five thousand foot soldiers, in the first encounter with the enemy, arrayed his ranks in such a manner that the front line was formed by those armed with spears and bucklers, while the archers and arbalists occupied the rear. The Huns, as well as the T'u-küe and Uigur of later date, according to the Chinese records (*Pei shi*, Chs. 97, p. 5; 99, p. 2), had spears.

[2] See Chapter VII and Fig. 51.

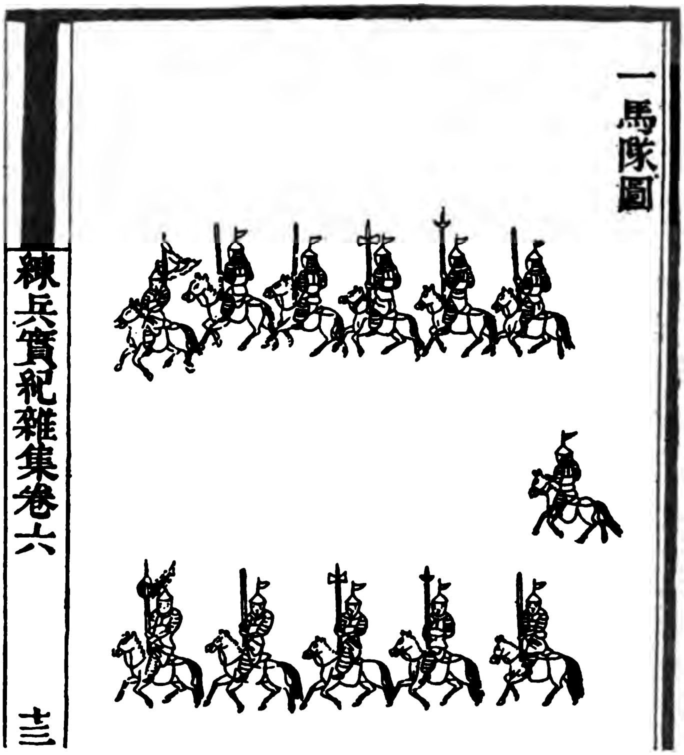
一馬隊圖
練兵實紀雜集卷六
十三

FIG. 37.

Detachment of Mail-clad Cavalry (from *Lien ping shi ki* of 1568).

In YULE's edition of Marco Polo (Vol. II, p. 501) is figured an interesting sketch from a Persian miniature of the thirteenth century, representing two mounted soldiers. They are styled by Yule "Asiatic warriors," and in all probability are intended for Mongols. The one of the two encased with a plate mail is charging with a lance; while his opponent is equipped with club and circular shield, a bow-case being suspended from his girdle.

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[1] A work on military art by Ts'i Ki-kuang, written in 1568 (WYLIE, Notes, p. 91). It is reprinted in *Shou shan ko ts'ung shu*, Vols. 51 and 52.

We hear of lancers in the history of the Sui dynasty, particularly in the insurrectionary wars leading to its downfall. Yang Hüan-kan, who died in 613,[1] revolted against the Emperor Yang of the house of Sui; his fortitude and audacity are emphasized in his biography, and it is recorded that in battle he brandished a long lance, while rushing at the head of his troops with loud war-cries.[2] Li Mi (582–618),[3] in his struggle against Wang Shi-ch'ung, availed himself of a cavalry troop equipped with long lances, who, enclosed in a narrow pass, were helpless against the riders of Wang Shi-ch'ung armed with short swords and bucklers.[4]

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[1] GILES, Biographical Dictionary, p. 903.

[2] *Sui shu*, Ch. 70, p. 2.

[3] GILES, *l. c.*, p. 453.

[4] *T'ang shu*, Ch. 84, p. 3.

IV. HISTORY OF CHAIN MAIL AND RING MAIL

> Steed threatens steed, in high and boastful neighs
> Piercing the night's dull ear, and from the tents
> The armourers, accomplishing the knights,
> With busy hammers closing rivets up,
> Give dreadful note of preparation.
>
> —SHAKESPEARE (*King Henry V*).

In the preceding notes we attempted to establish on the basis of inward evidence a progressive historical sequence indicating a connection which linked Irān, Turān, and China in matters of warfare and armament about the first centuries before our era. We now propose to subject to an investigation a specific case revealing in the time of the early middle ages the transmission of a well-defined type of body armor from Persia to China and other countries.

At the present time we find widely distributed over Asia an interesting type of defensive armor occurring in the two variations of chain mail and ring mail. The word "mail" is derived from French *maille* (Latin *macula*), and originally designates the mesh of a net. Chain mail consists of interwoven links of iron or steel so joined together that the whole affair in itself forms a shirt or coat. Ring mail is composed of rows of overlapping iron or steel rings fastened upon a heavy background of cloth or leather forming a jerkin. Chain mail was a favorite means of defence in the chivalrous age of Europe, during the twelfth and thirteenth centuries. At present specimens are still encountered in Persia, among the tribes of the Caucasus, in India, Tibet, Mongolia, Siberia, and China.[1] Tibet is probably now the only country in the world where chain mail is still donned in actual military service; while all other peoples simply keep it as an heirloom or relic of the past, or, like the chieftains of some Caucasian tribes, may sometimes parade it on ceremonial occasions.

The origin of chain mail, as will be seen from the following notes, is to be sought in Irān. The Persian chain mail is an astounding example of the migration and wide distribution of a cultural object over a vast area. Not only is it diffused over India, Tibet, and China, but also over the whole of Siberia; and it is interesting to note that nearly all observers in those regions are agreed as to its foreign origin.[1] Old Pallas[2] describes it as existing among the Kalmuk on the Volga, and "consisting in Oriental fashion of a net-work of iron or steel rings." According to his investigations, "it arrived there through commerce with the Truchmen and Usbek, likewise through wars with China; the finest is of *Persian* workmanship, wholly from polished steel, and is valued at fifty horses and even more. Such precious armor as well as fine swords and horses receive individual names among the Kalmuk and Tatar tribes. Armor of brass scales is the most common among the Mongols and in China." In various regions of the Altai, chain mail has been discovered which, according to W. Radloff,[3] does not come down from the so-called Siberian iron period, but was imported at much later times from other countries, perfectly agreeing in its form, as it does, with chain mail wrought in the southern part of Asia. A. v. Middendorff[4] states that shirts of chain mail are still found in the possession of some Tungusians, reminding them of the valiant deeds of their ancestors. But J. Gmelin[5] in the eighteenth century had already observed that they had fallen into disuse among them, and were shown as mere curiosities. They are now alive only in their heroic tales; nor did I encounter any, despite repeated inquiry, among the Tungusian tribes with which I came in contact in eastern Siberia. The same is the case with the Irtysh-Ostyak, a tribe of the Ugrian stock of peoples, whose princes, judging from the references in their epic songs, were formerly in possession of chain mail. S. Patkanov,[6] to whom this observation is due, comments that chain mail was previously known to almost all nations of western, and partially of middle and eastern Siberia, and that it presupposes a culture and manual dexterity superior to any that could be expected from most of these. Although the former inhabitants of those regions were rather well versed in the art of forging iron and weapons, he inclines toward the opinion that the shirts of mail formerly found among them originated from countries whose peoples were further advanced in culture, and that they were imported from the Orient through the medium of the

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[1] Reference to the use of chain mail among the Kiu-ku Miao has been made above (p. 194).

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[1] It is widely spread also over northern Africa (*Zeitschrift für Ethnologie*, Vol. XI, 1879, Verhandlungen, p. 34).

[2] Sammlungen historischer Nachrichten über die mongolischen Völkerschaften, Vol. I, p. 145 (St. Petersburg, 1776).

[3] Aus Sibirien, Vol. II, p. 130 (Leipzig, 1884).

[4] Reise in den äussersten Norden und Osten Sibiriens, Vol. IV, p. 1516 (St. Petersburg, 1875).

[5] Reise durch Sibirien, Vol. II, p. 644; and C. Hiekisch, Die Tungusen, p. 73 (Dorpat, 1882).

[6] Die Irtysch-Ostjaken und ihre Volkspoesie, Vol. II, p. 014 (St. Petersburg, 1900). In the Turkish epic poetry these iron armors are likewise mentioned (A. Schiefner, Heldensagen der Minussinschen Tataren, p. xvi, St. Petersburg, 1859).

Volga and Kama peoples, or rather from the southern Turko-Tatar tribes who seem to be very familiar with this kind of defensive armor. The representation of chain mail on figures in the cave-temples of Turkistan[1] might be directly traceable to Iranian influence, which is overwhelmingly manifest in those monuments. But let us first examine the state of affairs in regard to ancient Persia.

Specimens of Persian armor of very ancient date, unfortunately, seem not to have survived; and our knowledge of the subject is largely founded upon literary records, and on reconstructions based on the appearance of warriors as often represented in the stone sculpture of the Sassanian period. In regard to the armor of the ancient eastern Iranian tribes, W. Geiger[2] remarks that it possibly consisted of metal scales or of a texture of brazen rings. The fundamental passage for our knowledge of ancient Persian armor remains Herodotus (VII, 61); and A. V. W. Jackson,[3] taking it as the starting-point of his study, has made a very valuable contribution to the subject. According to the statement of Herodotus, the ancient Persians wore tunics with sleeves of diverse colors, having upon them iron scales of the shape of fish-scales; and this comparison leaves no doubt that scale armor, and not chain mail, is meant.[4] The nobles and commanders seem to have worn breastplates of golden scales, bedecked with a purple tunic (Herodotus, IX, 22). This passage shows that Persian armor was solid enough to resist the blows of the Greeks, as the blows falling upon the breastplate of Masistius had no effect. Only a certain portion of the Persian army was shielded by armor, for in the battle of Plataea they perished in great numbers owing to their light clothing, contending against the heavily armed Greeks (Herodotus, IX, 63). Ammianus Marcellinus (XXIV, 6; XXV, 1) informs us that the Persians opposed the Romans with such masses of mailed cavalrymen, that the iron scales of their armor suits, following the movements of the body, reflected a glaring splendor, and that their helmets, representing in front a human face, covered their heads completely, openings being left only for the eyes and nostrils, — the only spots where they were vulnerable.[1]

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[1] A. Grünwedel, Altbuddhistische Kultstätten in Chinesisch-Turkistan, pp. 8, 25 (Berlin, 1912).

[2] Ostiranische Kultur im Altertum, p. 444 (Erlangen, 1882).

[3] Herodotus vii, 61, or the Arms of the Ancient Persians illustrated from Iranian Sources (*Classical Studies in Honor of Henry Drisler*, pp. 95–125, 6 figs. and 1 plate, New York, 1894).

[4] According to O. Schrader (Reallexikon, p. 611), chain mail then became known in Europe for the first time.—The Persian shield mentioned by Herodotus under the name *gerron*, and contrasted with the Greek *aspis*, in my opinion, has not received full justice from the hands of Professor Jackson (*l. c.*, p. 99). The additional note of Prof. Merriam (p. 124) is very ingenious, but it should not be forgotten that Ammianus Marcellinus (xxiv, 6, 8) describes the Persian shields as oblong and curved (convex), of plaited willow, and covered with rawhide, and as used by the infantry composed of the rural population (quorum in subsidiis manipuli locati sunt peditum, contecti scutis oblongis et curvis, quae texta vimine et coriis crudis gestantes, densius se commovebant). Similar types of shields, in which wood and skin were combined, occurred among the Arabs (G. Jacob, Altarabisches Beduinenleben, p. 136; G. Migeon, Manuel d'art musulman, Vol. II, p. 246, Paris, 1907). Typologically, they correspond to the circular Chinese shields plaited from cane or rattan, and painted with the head of a tiger (p. 203). The *gerra* alluded to by Herodotus were, I am inclined to think, likewise devices of plaited willow. G. Rawlinson translates, "They bore wicker shields for bucklers." Also Xenophon (*Anabasis*, I, 8) speaks of Persian troops with wicker shields, and next to them heavy-armed soldiers with long wooden shields reaching down to their feet (the latter were said to be Egyptians). The ancients, according to the testimony of Vegetius (*Instituta rei militaris*, I, 11), who lived at the end of the fourth century A.D., availed themselves of round shields, likewise plaited from willow twigs (scuta de vimine in modum cratium corrotundata).

The iron scale armor of early times was retained in the age of the Arsacides and Sassanians. Then, also, the force of the Persian army was the cavalry, consisting of the nobles. The horsemen occupied the first place in the order of battle, and success depended chiefly on their strength and bravery. On the Sassanian rock-carvings, chain mail appears beside scale armor. A bas-relief, probably from early Sassanian times, represents such a Persian horseman clad with chain armor reaching almost down to his knees, and provided with sleeves; his neck-guard is so high as to envelop his head completely; he wears a helmet with floating ribbons, and carries a lance nearly two metres long in his right hand and a small shield in his left, a quiver being attached to his belt. Head, nape, and chest of the horse are likewise protected by chain armor.[2] At the time of the Khusrau, the complete outfit of the horsemen consisted of horse mail, a shirt of mail, a breastplate, cuishes, a sword, lance, shield, a club attached to the belt, a hatchet, a quiver containing two stringed bows and thirty arrows, and two twisted strings in reserve fastened to the helmet.[1] The manufacture of armor was at the height of perfection in the Sassanian epoch. When the Arabs overran the Persian Empire and conquered Ktesiphon, they found in the well-equipped arsenals the king's cuirass with brassards, cuishes, and helmet, the whole wrought in pure gold.[2]

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[1] Contra haec Persae objecerunt instructas cataphractorum equitum turmas sic confertas, ut laminis coaptati corporum flexus splendore praestringerent occursantes obtutus.—Ubi vero primum dies inclaruit, radiantes loricae limbis circumdatae ferreis, et corusci thoraces longe prospecti, adesse regis copias indicabant.—Erant autem omnes catervae ferratae, ita per singula membra densis laminis tectae, ut juncturae rigentes compagibus artuum convenirent: humanorumque vultuum simulacra ita capitibus diligenter apta, ut imbracteatis corporibus solidis, ibi tantum incidentia tela possint. haerere, qua per cavernas minutas et orbibus oculorum adfixas parcius visitur, vel per supremitates narium angusti spiritus emittuntur.

[2] Christensen (L'empire des Sassanides, p. 60, Copenhague, 1907), who describes this armor, says that it is scale armor. The monument to which he refers seems to be identical with the one illustrated by J. de Morgan (Mission scientifique en Perse, Vol. IV, p. 319) after a bas-relief of Takht-i-Bostān, and identified with Khosrau II Purwēz (591–628). De Morgan, however, interprets this armor as chain mail, which plainly appears on the helmet as reconstructed by him, enveloping the entire face and neck, two almond-shaped openings being left for the eyes; this coif of mail attached to the iron calotte of the helmet, according to de Morgan, is joined to the mail of the armor. Sarre and Herzfeld (Iranische Felsreliefs, p. 203, Berlin, 1910), in their description of this bas-relief, give the same interpretation of chain mail. According to the same authors (p. 74), the costume of a king on a Sassanian relief of Naqsh-i-Rustam consists of scale armor, and ring mail for the protection of arms and legs. On another relief (p. 83) the same kind of armature is pointed out, scale armor reaching down to the hips, while arms and legs seem to be enveloped with ring mail. In two other places (pp. 203, 249), however, chain mail reaching down to the knees is pointed out. I am under the impression that de Morgan and Sarre,

Chain mail, which doubtless existed under the Sassanians, is distinctly mentioned in the Avesta (*Vendidad*, XIV, 9) under the name *zrādha*. According to Jackson,[3] this word is presumed to designate the ringed mail-coat; so called, it is thought, from its rattling. The word is derived from the root *zrād* (corresponding to Sanskrit *hrād*), which means "to rattle." The Pahlavī version of the Vendidad passage renders the word *zrādha* by *zrāī*, which answers to Firdausī's[4] Persian word *zirih*, already explained by Vullers in his *Lexicon Persico-Latinum* as "vestis militaris ex anulis fereis conserta." The identification of *zirih* or *zireh* with chain mail seems to be certain, for under the

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in their interpretations of armor on the bas-reliefs, are somewhat influenced by the statement of Herodotus. There can be no doubt, however, that chain mail was known in Persia during the Sassanian epoch, and at the much earlier age of the Avesta (see above).

[1] Compare A. Christensen (*l. c.*, p. 60); C. Inostrantsev, Sassanidian Studies, p. 80 (in Russian, St. Petersburg, 1909).

[2] Christensen (*l. c.*, p. 106).

[3] *L. c.*, p. 117. Bartholomae (Altiranisches Wörterbuch, p. 1703) renders the word only by "Panzerkoller, Panzer."

[4] Compare the passage from the *Shāh-nāmeh* quoted by Jackson (*l. c.*, p. 107). O. Schrader (Sprachvergleichung und Urgeschichte, p. 103; and Reallexikon, p. 611) assumes that Avestan *zrādha* had the meaning "scale armor," and is identical with the one described by Herodotus. This opinion seems to me unfounded; Persian *zirih*, which is derived from that word, and the same transmitted to India, have the significance "chain mail;" so that also *zrādha* is most likely to have had the same meaning. Schrader's point of view is merely prompted by the desire to make the interpretation of the word conform with the passage of Herodotus. This is naturally one-sided: Irān must have possessed various types of armor from ancient times, and chain mail must have pre-existed there before it was propagated from this centre to all parts of the world. From the Chinese account given below, it follows that chain mail held its ground in Sogdiana in the beginning of the eighth century; and if Jackson's identification of the Sino-Persian term *kei-li-dang* occurring in the Annals of the Sui Dynasty (see this volume, p. 28, note 1) is correct, we should have additional evidence for the employment of chain mail in Sassanian Persia. Of course, I do not mean to say that scale armor was out of commission during the Sassanian period; it may very well have persisted during that time, together with a variety of other kinds of armor. The fact that such were then in existence is brought out by the figure of the Persian grandee hunting a boar and a lion on the famous silver bowl in the Eremitage of St. Petersburg (A. Riedl, Ein orientalischer Teppich vom Jahre 1202, p. 28; and reproduced in many other books). A real history of Persian armor remains to be written.

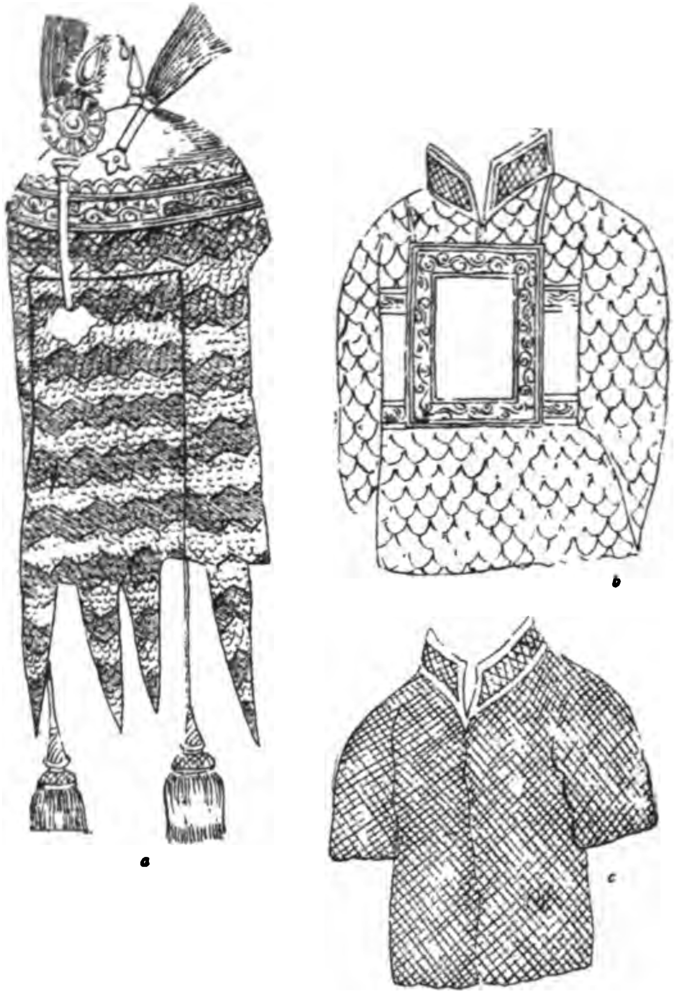

FIG. 38.

Helmet and Chain Mail from *Ain I Akbari* (Blochmann's translation, Vol. I, Plate XIII): (*a*) Helmet with Nasal and Coif of Mail; (*b*) Chain Mail with Breastplate (*bagtar*); (*c*) Chain Mail composed of Steel Links (*sireh*).

same name we meet this armor in the soldiery of the Indian Moghuls.[1] It is figured among the sketches of the *Ain I Akbari*, a history of the Emperor Akbar, written in 1597 by Abul Fazl Allami (1551–1602).[2] As this work has now become exceedingly rare, three illustrations from it are here reproduced from a copy in the writer's possession (Fig. 38). They are instructive from more than one point of view. First, they furnish actual proof of Persian chain mail, as well as helmet, having been transmitted from Persia into India. Second, as regards the manner of drawing, it will be noticed that the coat in Fig. 38 *b* is strikingly similar to the Chinese sketch of ring mail in Fig. 41. Both convey the impression of scale armor, but are explained as, and intended for, chain mail and ring mail respectively.[3] It is exceedingly difficult to produce a good sketch of either; and it is interesting to note that two draughtsmen, independent of each other, have had recourse to the same mechanical means of representing them. They teach, as many other cases, that caution and criticism are necessary in diagnosing types of armor after pictorial or other designs.[4] The helmet (Fig. 38 *a*) with nasal and coif of mail (*mighfar*) is the same as that still extant in India, and from there conveyed to Tibet (Plate XXVIII). IRVINE (p. 565) describes the *zirih* as a coat of mail with mail sleeves, composed of steel links, the coat reaching to the knees. There are six specimens in the Indian Museum. Armor in the collection of the Nawāb Wazīr at Lakhnau is described in 1785 as follows: "The armor is of two kinds, either of helmets and plates of steel to secure the head, back, breast, and arms, or of steel network, put on like a shirt, to which is attached a netted hood of the same metal to protect the head, neck, and face. Under the network are worn linen garments quilted thick enough to resist a sword. The steel plates are handsomely decorated with gold wreaths and borders, and the network fancifully braided."

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[1] W. IRVINE, The Army of the Indian Moghuls (*Journal Royal As. Soc.*, 1896, p. 565).

[2] Translation of H. BLOCHMANN, Vol. I, Plate XIII (Calcutta, 1873).

[3] IRVINE (*l. c.*, p. 564) remarks that from this figure it may be inferred that, in a more specific sense, *baktar* or *bagtar* was the name for fish-scale armor. Yet BLOCHMANN's explanation of this figure, according to the *Ain I Akbari*, is "chain mail with breastplate (*bagtar*)."

[4] Chinese sketches of defensive armor certainly are far from being good or accurate; on the contrary, they are purely conventional in style, a fixed and ready-made motive or model being employed for each type of armor. Yet they are not much worse than corresponding designs from India, Persia, and mediæval Europe. At all events, they are interesting, and in many respects even instructive. Whatever their defects may be, if we are willing to understand the symbolic language of the draughtsmen, their productions allow us in the majority of cases to recognize what type of armor is intended by them, in the same manner as inferences as to the type of armor intended may be deduced from the terminology of the language. In cases where no actual specimens are at our disposal, the Chinese illustrations may still claim a primary importance; where we have specimens to study, as in the case of chain mail and plate armor, the sketches of the Chinese afford opportunity for an instructive comparison; and for this reason I have drawn upon these sources also. They may render us essential assistance in interpreting the types of armor represented in statuary and painting.

Thus Persian chain mail spread to India in the Moghul period. W. EGERTON[1] observes that Persian arms were generally worn by the upper classes in India, and that the blades of swords were often Persian, even though mounted in India; in fact, as Persian artificers were frequently employed at the principal native courts, it is difficult sometimes to say whether a piece of armor is Persian or Indian.

Whether ancient pieces of chain mail are still preserved in Persia, I am unable to say.[2] Plates XXIII–XXV illustrate a piece of mail complete with all paraphernalia, the shirt with long sleeves being open in front. It was obtained at Tiflis by Mr. Charles R. Crane of this city, and is said to have served as the parade armor of a chieftain of the Khewsur.[3] It is doubtless of Persian manufacture, as proved principally by the Persian designs on the arm-guard (Plate XXV, Fig. 2). J. MOURIER[4] has already observed that the helmets with coifs of mail and the suits of chain mail found among the tribes of the Caucasus seem to be of Persian origin. The rings forming the texture of that mail consist of thin iron wire loosely twisted together, being neither welded nor riveted. This rather degenerate style of workmanship testifies to the fact that the suit in question was merely intended for ceremonial or pageant purposes: an energetic sword-blow would probably shatter the whole outfit. The iron casque of the well-known Persian form, called in Persian *zirih-kulāh*, is provided with a sliding nasal (nose-guard), and with a couvre-nuque consisting of a long coif of mail guarding forehead, cheeks, neck, and shoulders. On Plate XXV the two-edged sword, arm-guard, hauberk, and gauntlet, completing the set, are shown.

The Arabs have undoubtedly derived chain mail from the Persians. All the available historical evidence is decidedly in favor of Persian priority.[1] Among the ancient Arabs of the pre-Islamic epoch we meet with leather and iron armor,[2] without any clear description of their appearance. The latter seem previously not to have consisted of mail, though this cannot be stated positively; but according to the descriptions of the poets, chain mail comes into question in the majority of cases.[3] Tradition ascribed its invention to King David, and the Korān (Sūre XXI, 80; XXXIV, 10) sets forth that God himself taught David how to smelt iron, with which to make the rings, and to join them into a solid armor. This story certainly is devoid of historical value. The place Salūk in Yemen was of old renowned for its armor consisting of a double row of rings. Also "Persian armor" is mentioned in Arabic records, whereby garments lined with silk and cotton were understood. "Armor from Sogd" (Sogdiana) became known after the foreign conquests of the Arabs.[4] Possibly also scale armor was worn.[5]

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[1] An Illustrated Hand-Book of Indian Arms, p. 142 (London, 1880).

[2] According to EGERTON (*l. c.*, p. 141), armor is now no longer worn in Persia, except to add to the pageant of their religious processions, held annually in the month of Muharram, to commemorate the death of Hassan and Hussain, the Shiah martyrs. Many that are of modern manufacture have been made for ornament rather than use, and betray in their style the decline of the art. The best period, judging from the examples preserved, seems to have extended from the time of Shah Abbas to that of Nadir Shah. The armor of Shah Abbas is in the British Museum; it is figured in G. MIGEON (Manuel d'art musulman, Vol. II, p. 251, Paris, 1907).

[3] I am under obligation to Dr. Charles B. Cory, the present owner of the armor, for his courtesy in placing it at my disposal.

[4] L'art au Caucase, pp. 156, 157 (Paris, 1907).

Chao Ju-kua narrates that the ruler of Basra, when he shows himself in public, is accompanied by more than a thousand mounted retainers in full iron armor, the officers wearing chain mail.[6]

During the early middle ages of Europe, the horses of armies were not caparisoned. Only from the beginning of the thirteenth century, probably under the influence of the Crusades, were they protected by chain-mail covers.[7]

According to MAX JÄHNS,[8] the chain mail (*Parsen*, *Barschen*), as it first appears during that time in the armature of the horse, is probably of oriental, and more specifically of Persian origin. Dr. BASHFORD DEAN,[9] the great authority on armor in this country, offers the following suggestive summary of this subject: "Chain mail marked a distinct epoch in the development of arms and armor: for it was light, flexible, and extremely strong. And it soon, therefore, came to supplant the cruder defences of Carolingian times. Some authorities maintain that this form of armor was borrowed from the Orient; and certain it is that its development in the twelfth and thirteenth centuries was largely influenced by oriental models. If, however, this form of armor were derived originally from the East, it is a rather remarkable fact that its early appearance in Europe should be traced so clearly to the northern peoples, and that the 'byrnie' (*brünne*), or shirt of mail, should have become a characteristic part of the equipment of a Norseman. Nevertheless it may still have been derived primitively from the East, since it is well known that the early excursions of the Viking carried them well into the Mediterranean, and that even by the eighth century they were well acquainted with many objects of oriental origin." The Arabs and Byzantines have transmitted chain mail to Europe; and a share in this movement may be attributed to the cultural exchanges between East and West during the crusades.

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[1] Compare the notes of C. H. BECKER (*Der Islam*, Vol. IV, 1913, pp. 310–311).

[2] F. W. SCHWARZLOSE, Die Waffen der alten Araber aus ihren Dichtern dargestellt, pp. 325, 328 (Leipzig, 1886).

[3] *Ibid.*, p. 331.

[4] *Ibid.*, p. 334.

[5] G. JACOB, Altarabisches Beduinenleben, p. 136 (Berlin, 1897). BECKER (*l. c.*) mentions also Arabic cotton armor (*lubbāda*); what he calls ring mail (*Ringpanzer*), I believe, strictly speaking, is chain mail. In the age of the T'ang (618–906) the soldiers of the Arabs were equipped with bow, arrows, long spears, and metal armor (*T'ang shu*, Ch. 221 B, p. 8 b).

[6] *Lien huan so-tse kia*, literally, "armor of chains, the links of which are mutually connected" (see HIRTH and ROCKHILL, Chau Ju-kua, p. 137).

[7] G. STEINHAUSEN, Geschichte der deutschen Kultur, p. 247; L. BECK, Geschichte des Eisens, Vol. I, p. 863.

[8] Ross und Reiter, Vol. II, p. 137.

[9] Catalogue of European Arms and Armor (*The Metropolitan Museum of Art*, Hand-Book No. 15, p. 21, New York, 1905).

At the time of Mohammed the Arabs had already adopted the Persian practice of protecting horse and man with armor, the armored horsemen and horses being designated *mudjaffaf;* that is, clad with the *tidjfāf*, the Persian felt armor.[1]

When we come to China, the situation is the same as in Europe and in India. Historical evidence is not lacking for the foreign origin of Chinese chain mail. Indeed, the first record alluding to it, the *T'ang shu*,[2] in its account of *K'ang* (Sogdiana, Samarkand), states that in the beginning of the period K'ai-yüan (713–741), Samarkand sent to China chain armor (*so-tse k'ai*) as tribute.[3] The famous poet Tu Fu, who lived about this time (712–770), alludes in a verse to a "metal-chain cuirass" (*kin so kia*).[1] Chain armor (*so-tse kia*)[2] is distinctly mentioned in the *Wan hua ku*, a work written at the end of the twelfth century,[3] in which are enumerated the designations for thirteen kinds of armor known at that period. Chain armor is there listed as the twelfth in the series; and it is expressly stated that it ranges in the class of iron armor (*t'ie kia*). In all probability, however, this passage is taken from the *T'ang leu tien* (the "Six Statutes of the T'ang Dynasty") drawn up by the Emperor Yüan-tsung in the first part of the eighth century (p. 189); and as the thirteen kinds of armor on record are said to have been made at that time in the Imperial Armory, we may presume that chain mail was turned out by the Chinese as early as the T'ang period, after models first introduced from Samarkand.

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[1] Compare C. H. BECKER (*Der Islam*, Vol. IV, 1913, p. 311). BECKER states that the history of defensive armor in the Islamic world still remains to be written; but his remarks render it sufficiently clear that the origin of these things is to be sought in Persia, and that they were transferred to Europe through the medium of the Arabs and Byzantines. The soldiers of the Byzantine army were protected for the most part by scale armor, though, judging from quite early monuments, ring or chain mail was sometimes used (O. M. DALTON, Byzantine Art and Archæology, p. 684, Oxford, 1911).

[2] Ch. 221 B, p. 1 b.

[3] A tribute of armor from Samarkand is still recorded in the *Ming shi* under the year 1392 (see BRETSCHNEIDER, *China Review*, Vol. V, p. 123). It can of course be presumed only that the chain mail sent by Samarkand was of Persian origin; but this conclusion is most probable, as the culture of Sogdiana, the capital of which was Samarkand, was thoroughly Iranian. From what was said above on "armor from Sogd" it seems that among the Arabs Sogdiana was regarded as a famous seat of the manufacture of armor. In view of the fact that chain mail is an Iranian import in China it is curious that in the Persian legend of Alexander's expedition to China, the King of China presents to him among many other things a hundred long coats of mail (H. ZOTENBERG, Histoire des rois des Perses, p. 440). In *T'ang shu* (Ch. 220, p. 3 b), where an account of the foreign tribes of the east, including Koreans and Tungusians, is given, mention is made of a *so kia* ("chain cuirass"); the word *k'ai* is not used, and the question is probably of a leather corselet with rings attached to its surface.

In the Biography of Han Shi-chung, who died in 1151,[4] a "chain connected armor" (*lien so kia*) capable of resisting bows is credited to this general;[5] but it would seem that this newly-coined term does not refer to a real chain mail, but rather to ring mail, in which rows of iron rings are fastened to a foundation of leather (see p. 252).

According to the testimony of WILLIAM OF RUBRUCK, chain mail, which he styles haubergeon, was known to the Mongols.[6] In the year 1345, during the reign of the Emperor Shun, Djanibeg (1342–1356), son of Uzbeg,[7] sent to China, among other products, swords, bows, and chain mail coming from Egypt (Mi-si-rh).[8]

Chain armor had no official recognition in China, and was never introduced into the army. It is conspicuously absent in the military regulations of the Ming dynasty, nor is it mentioned in the well-informed military work *Wu pei chi*. We have to go as far down as in the K'ien-lung period to renew its acquaintance. We meet it there again as a foreign import. In the Imperial State Handbook of the Manchu

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[1] *P'ei wên yün fu*, Ch. 50, p. 70 (under *so*), or Ch. 106, p. 74 (under *kia*). There is also a quotation given there to the effect that "the finest of armors are designated chain mail," derived from a poetical work *Erh lao t'ang shi hua*, the date of which is unknown to me.

[2] Entered in GILES's Dictionary, p. 1264 c, with the same translation.

[3] BRETSCHNEIDER, Botanicon Sinicum, pt. 1, p. 160, No. 330.

[4] GILES, Biographical Dictionary, p. 251. His biography is in *Sung shi* (Ch. 364, p. 1).

[5] *Sung shi*, Ch. 364, p. 6 b.

[6] W. W. ROCKHILL, The Journey of William of Rubruck, p. 261 (London, 1900). Rubruck reports that he once met two Mongol soldiers out of twenty, who wore haubergeons. He asked them how they had got hold of them; and they replied that they had received them from the Alans, who are good makers of such things, and excellent artisans.

[7] BRETSCHNEIDER, Mediæval Researches, Vol. II, p. 15.

[8] *Yüan shi*, Ch. 43, p. 5 b (K'ien-lung edition).

Dynasty (*Huang chʻao li kʻi tʻu shi*, Ch. 13, p. 53) a piece of chain mail is illustrated (reproduced in Fig. 39) under the name *so-tse kia*. It is recorded that in 1759, after the subjugation of Turkistan, numerous captives were made, and innumerable spoils of arms obtained which were hoarded by imperial command in a building of the palace, the *Tzʻe kuang ko*. Among these trophies were several pieces of chain armor; and a document recording this event was draughted, and deposited beneath those objects in the treasury. This shows that in the Kʻien-lung period chain armor was foreign to the Chinese and considered an object of curiosity and rarity. The specimen consists of a jacket and trousers. The rings are said to be iron; but it is not stated whether they are riveted, nor can this be gathered from the illustration. The shirt of mail is closed in front, and put on over the head. The collar, as ex-

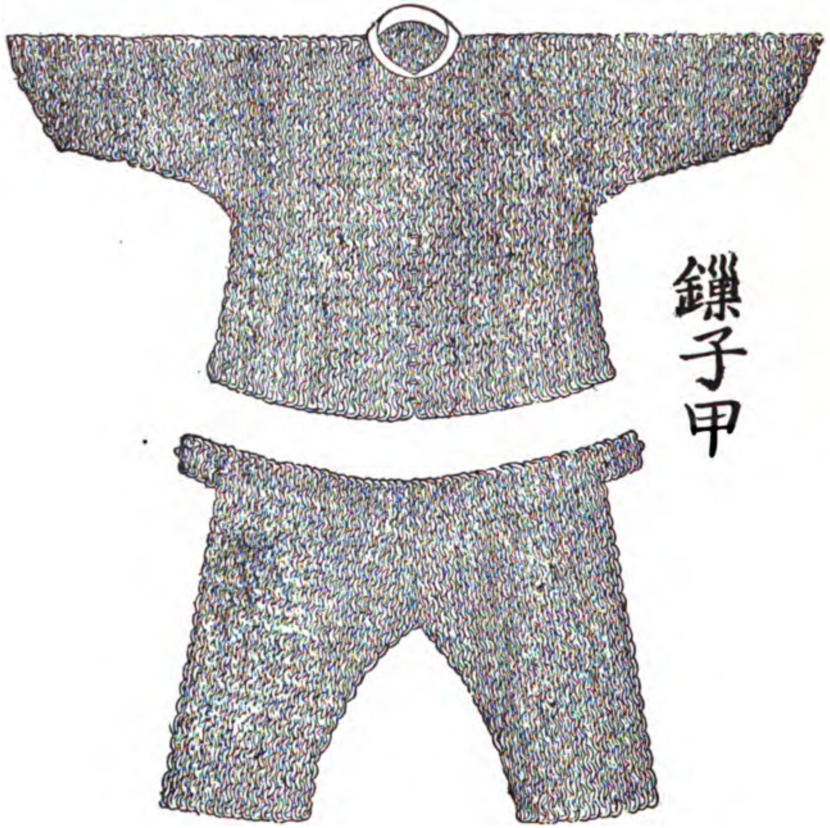
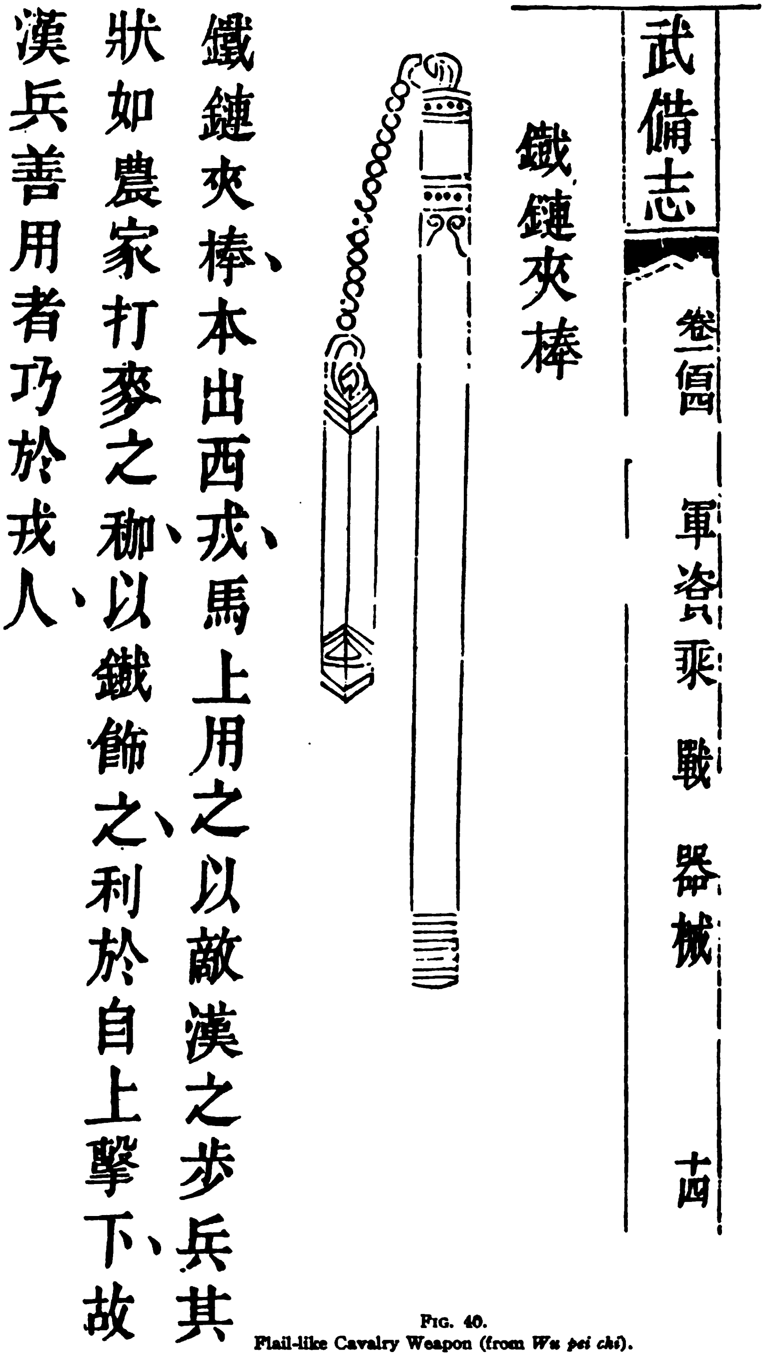


Fig. 39.
Iron Chain Mail from Turkistan (from *Huang chʻao li kʻi tʻu shi*).

plained in the text, is made of white cotton and tied up by means of a cord.

Two specimens of chain mail secured in China are represented on Plate XXVI. Both are jackets with sleeves, having a short slit underneath the neck, and being tied up by means of a leather band. Though identical in appearance, they are of different technique. The shirt of mail shown in Fig. 1 of the Plate consists of riveted steel rings; the one in Fig. 2, of welded iron rings. The former was obtained at Si-ning, Kan-su Province, with the information that it had previously hailed from Tibet; the latter, at Si-ngan, Shen-si Province. These two coats, accordingly, are technically much superior to the one from the Caucasus, in which the rings are merely of twisted iron wire not welded. It is thus clear that there are coats of mail widely varying in the technical process and in quality. To decide the question as to the locality where the two specimens were manufactured would require a larger comparative material than is at my disposal. The Tibetans, as will be seen presently, must be discarded as being unable to produce chain mail. The Chinese, as we noticed, may have themselves made it in the T'ang period; it is certain, however, that none is turned out in China at the present time. Altogether, these specimens are scarce; and modern Chinese accomplishments in iron and steel are so crude and inferior, that it is difficult to believe in the Chinese origin of the two pieces of mail. Particularly the mail in Fig. 1 of Plate XXVI represents such a complex and toilsome technicality, involving so great an amount of time and patience as can be credited only to a highly professional and skilful armorer, who was a specialist in this line; the process of riveting steel rings, moreover, is not practised by the Chinese. My personal impression in the matter, therefore, is that the two mails were fabricated in Persia or Turkistan, and thereupon traded to China.

An offensive weapon deserves attention in this connection, because a chain is utilized in it, and its invention is ascribed by the Chinese to a foreign tribe. This is the *t'ie lien kia* (No. 1132) *pang*, a weapon consisting of two wooden cudgels, the one nearly three times the length of the other, their upper ends being connected by an iron chain (Fig. 40). The longer cudgel is round, and is held by its lower end in the hands of the soldier; the shorter one is square in cut, and provided at the end with a sharp iron point intended to hit the enemy's head. The chain allowing it ample freedom of motion, it is swung around in a wide circle, thus making it a fierce and powerful weapon. The *Wu pei chi*, illustrating and describing this instrument (Ch. 104, p. 14), states that its original home was among the Si Jung (the Western Jung), one of the general designations for the Turkish and Tibetan tribes living north-west



武備志

卷一百四 軍資乘 戰 器械 十四

鐵鏈夾棒

鐵鏈夾棒、本出西戎、馬上用之、以敵漢之步兵、其狀如農家打麥之枷、以鐵飾之、利於自上擊下、故漢兵善用者乃於戎人、

FIG. 40.
Flail-like Cavalry Weapon (from *Wu pei chi*).

from China; that they made use of it, while riding on horseback, in fighting Chinese infantry; and that the Chinese soldiers learned to handle it, and are more clever at it than the Jung. Its shape is compared to a threshing-flail; and it may even have been derived from this implement, with which it agrees in mechanical principle. It is still known in Peking under the name of "threshing-flail," and is used in fencing. I saw this sport practised in 1902, and at that time secured a specimen for the American Museum, New York. In the time of the Emperor K'ien-lung it was still employed in the Chinese army.[1]

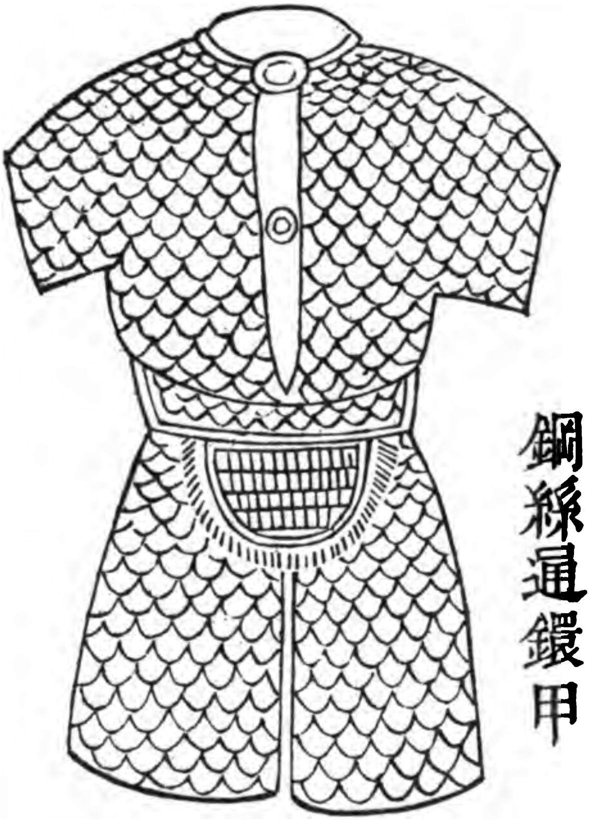


FIG. 41.
Ring Mail of Steel Wire (from *Wu pei chi* of 1621).

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[1] *Huang ch'ao li k'i t'u shi*, Ch. 15, p. 25 b. According to this work, the weapon is first mentioned in the *T'ung tien* of Tu Yu, who died in 812, where it is said that it was manipulated by women on the walls to resist invaders. Ti Ts'ing, the famed general in the wars against the western Liao (biography in *Sung shi*, Ch. 290), who died in 1057, employed it on horseback.

Different from chain mail, though allied to it, is the ring mail. The *Wu pei chi*, as far as I know, is the only source to inform us of the existence of this type of armor in China (Fig. 41). The cut of this book is here reproduced, not only because it is unique in the representation of this specimen, but also because it is very instructive in showing us again how difficult it is to draw inferences from oriental illustrations as to the real type of armor intended by the artist. Any expert in armor, casting a glance at this sketch furnished by the Ming edition of the *Wu pei chi*, could voice no other opinion than that it is meant to represent a type of scale armor. But the author, as plainly stated in the heading, means to represent a ring armor made of steel wire; and the description added by him leaves no doubt of this intention. He states that "armor of connected rings wrought from steel wire was formerly made by the Si K'iang, and that the structure of the rings is identical with the large iron wire rings of his time, with openings as big as in a coin; in shape, it is like a sort of shirt, and it is held together above by a collar; it is not open in front, but put on over the head; spears and arrows can hardly ever pierce it and cause wounds." Unfortunately he omits to state what the foundation is to which the rings are fastened; but from the drawing, in which the rings are arranged in overlapping rows, it is necessary to conclude that they were attached to a solid garment, in the same manner as our ring mail, which consisted of steel rings sewed edgewise upon leather or strong quilted cloth.

The name K'iang (No. 1264) mentioned in this text, as is well known, is a general designation for the multitude of ancient Tibetan tribes, at a time when they were still settled in the western parts of Chinese territory. A. WYLIE[1] has translated from the Annals of the Later Han Dynasty the records pertaining to them. They were exterminated by the Han dynasty.[2] The Chinese tradition tracing ring mail to Tibetan tribes is significant, though it is not necessary to adopt the opinion that the latter ever really made it. Yet the fact remains that ring mail still occurs among the Tibetans. There is even a Chinese source of the middle of the eighteenth century alluding to it. In the *Si-tsang ki* ("Records of Tibet"), a small but interesting work on Tibet in two volumes, published in 1751 by Chu K'i-tang (Ch. 1, p. 23), three kinds of armor in use among the Tibetan soldiers are enumerated,—the scale armor (*liu ye*, "willow-leaves"), the ring armor (*lien huan*, "connected rings"), and the chain armor (*so-tse*).[1] This naturally carries us to Tibet and its relations to Persia in the matter of chain mail; but before taking leave of China, it should be emphasized that chain mail remains the only type of armor borrowed and imported by her directly from a foreign country. With this exception, the making of armor, though foreign impulses cannot be denied, is purely indigenous, and also Chinese in its essential characteristics. From a negative point of view, its independence from the west is exhibited by several features that are lacking in Chinese, but which occur in western armor: as, for instance, the curious nasal (or nose-guard), characteristic of Persian, Indian, and Turkish helmets (Plates XXV and XXVIII); and gauntlets, absent in China, but met in Persia, India, and Japan.

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[1] History of the Western Kiang (*Revue de l'Extrême-Orient*, Vol. I, 1883, pp. 424–478).

[2] CHAVANNES, Les Mémoires historiques de Se-ma Ts'ien, Vol. III, pp. 591, 595; and Trois généraux chinois (*T'oung Pao*, 1906, pp. 256–258).

The Persians seem to have had relations with Tibet at an early date. In the "Histoire des Rois des Perses," translated (from an Arabic source composed between 1017 and 1021) by H. ZOTENBERG (p. 434), Alexander the Great is made to undertake an expedition into Tibet, whose king offers him submission and a tribute of a hundred loads of gold and a thousand ounces of musk. The two products of Tibet most eagerly solicited by the Persians are clearly emphasized in this legend. Among the wonders possessed by King Abarwīz figured the "malleable gold" extracted for him from a mine of Tibet (*ibid.*, p. 700); this was a block of gold five hundred grains in weight, flexible like wax; when pressed in one's hand, it passed through the fingers and could be modelled; figures were fashioned from it, and it would then assume its former shape again.

The Annals of the Sui Dynasty[2] have preserved a most interesting account of a country styled Fu, situated over two thousand *li* north-west of Sze-ch'uan. As I hope to show in detail on a future occasion, the question here is of a Tibetan tribe with a thoroughly Tibetan culture. The particular point that interests us in this connection is that this tribe of Fu possessed helmets and body armors of varnished hide, and that armor played a significant part in its funeral ceremonies. The corpse was placed on a high couch; it was washed, and dressed with helmet and cuirass; and furs were piled upon it. The sons and grandsons of the dead man, without wailing, donned their cuirasses, and performed a sword-dance, while exclaiming, "Our father has been carried away by a demon! Let us avenge this wrong and slay the demon!"

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[1] As the Tibetans, even less than the Chinese, can be credited with the manufacture of chain mail, and as Tibetan chain mail is plainly stamped as a Persian import, suspicion is ripe that also Tibetan (and consequently Chinese) ring mails are derived from the same source; but strict evidence for the antiquity of ring mail in Irān yet remains to be brought forward.

[2] *Sui shu*, Ch. 83, p. 8.

This truly was the burial rite of a militant and valiant people, the dead being believed to continue their lives as warriors, and the survivors combating with their arms the demon who was supposed to have swept him away. A similar idea was symbolically expressed on the burial-places of the Tibetan heroes, who during the age of the T'ang had fallen in their bitter strifes with the Chinese. As related in the T'ang Annals, white tigers were painted on the red-plastered walls of the buildings belonging to their sepulchral mounds scattered along the upper course of the Yellow River: when alive, they donned a tiger-skin in battle, so the tiger was the emblem of their bravery after death.[1]

The Tibetans were a warlike nation in the early period of their history, and at times the terror of their neighbors, even of China. The Annals of the T'ang Dynasty,[2] which call them T'u-po (Tibetan *Bod*), and describe at length their relations with the empire from the seventh to the ninth century, praise their armor and helmets as excellent, covering the entire body, and leaving openings for the eyes only;[3] so that powerful bows and sharp swords cannot wound them very much. This passage, however brief, allows the inference that Tibetan armor of that period was of iron (for it is designated with the word *k'ai*, No. 5798); that it was a complete armor with brassards, cuishes, and greaves; and that the helmet was provided with a visor.[4] The "gold" armor,[5] which King Srong-btsan sgam-po, according to *T'ang shu*, is said to have transmitted as a gift to the Emperor T'ai-tsung when he wooed the hand of a Chinese princess, is perhaps not to be taken too literally; the word *kin* may simply mean "metal."[6]

Among the eastern Tibetan tribes we have proof for the existence of iron armor as early as the sixth century. The *Pei shi*[7] imparts the interesting news that in the first year of the period Pao-ting of the Pei Chou dynasty (561 A.D.) the Pai-lan, a tribe of the K'iang, who in matters of customs and products agreed with the Tang-ch'ang,[8] sent envoys with a tribute of cuirasses made from rhinoceros-hide (*si kia*) and iron armor (*t'ie k'ai*).

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[1] *T'oung Pao*, 1914, p. 77.

[2] *T'ang shu*, Ch. 216 A, p. 1 b.

[3] A striking analogy with the Persian helmet as described by Ammianus Marcellinus (above, p. 240).

[4] Presumably of a similar type as the royal Persian helmet figured by J. DE MORGAN (Mission scientifique en Perse, Vol. IV, p. 320, Paris, 1897).

[5] Thus translated by S. W. BUSHELL, The Early History of Tibet, p. 10 (reprint from *Journal Royal Asiatic Society*, 1880).

[6] A golden (*huang kin*) armor, referring to the T'ang period, is mentioned in *Ming huang tsa lu* (Ch. B, p. 2).

[7] Ch. 96, p. 9 b.

[8] Regarding these tribes compare S. W. BUSHELL (The Early History of Tibet, p. 94), and W. W. ROCKHILL (The Land of the Lamas, p. 337). Tibetan armor has not infrequently been sent to China; specimens are preserved, and may still be seen

There is a somewhat vague Tibetan tradition relative to the period of the early legendary kings, to the effect that armor was first introduced into central Tibet from Lower K'ams (*Mar K'ams*) in the eastern part of the country.[1] It is difficult to decide as to what type of armor is to be understood in this passage, in which occurs the general word *k'rab*, the original meaning of which, as we tried to show (p. 195),[2] must have been "scale armor." It may be permissible to think, in this case, of a style of hide armor, as it was in vogue among the Fu and the neighboring Shan and Man; but the tradition which here crops out is somewhat weak and hazy.

Coats of mail are frequently alluded to in Tibetan epic literature and historical records. In the History of the Kings of Ladākh they are mentioned under the reign of the seventeenth king, bLo-gros C'og-ldan, as being brought from Guge, eighteen in number; the most excellent of them receiving individual names, as was the case also with swords, saddles, turquoises, and other precious objects.[3] The usual types of armor in Ladākh were chain or scale armor. The fact that they are recorded as coming from Guge is significant, for Guge must have had ancient relations with Persia;[4] and the chain mail of Guge was most probably of Persian origin. The plain fact remains that the Tibetan blacksmiths do not turn out iron chain mail, nor are they capable of making it; so that they are most unlikely ever to have made it at any earlier time. The supposition of an import is therefore the only solution of the problem.

The *Wei Tsang t'u chi*, a description of Tibet by Ma Shao-yün and Mei Si-shêng written in 1792, has the following note on the outfits of

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in many Lama temples. The *Ming shi* tells of a tribute of armor, swords, and products sent in 1374 by the country of Ngan-ting in the territory of the Kuku-nōr, which was classified among the Si Fan (BRETSCHNEIDER, *China Review*, Vol. V, p. 32).

[1] CHANDRA DAS, in *Journal Asiatic Society of Bengal*, 1881, pt. 1, p. 214.

[2] B. HOUGHTON (Outlines of Tibeto-Burman Linguistic Palæontology, *Journal Royal Asiatic Society*, 1896, p. 41), in pointing out the coincidence of Tibetan *k'rab* and Burmese *k'yap*, remarks that each word denotes originally a flat, thin thing or scale, and that hence they come to mean scale armor. "It is, of course, possible," he adds, "that this was possessed by the Burmans in Tibet, but on the other hand it is equally probable that the words have been applied independently on the introduction of this particular kind of armor, (? from China)." This view seems forced. The words *k'rab* and *k'yap* are not loan-words from Chinese, but on equal footing with Chinese *kia* and *kiai*, and speak in favor of scale armor having been a very ancient means of defence in the Indo-Chinese group of peoples.

[3] Compare MARX, in *Journal Asiatic Society of Bengal*, Vol. LX, pt. 1, 1891, pp. 122, 123. Also among the ancient Arabs, excellent armors were named (SCHWARZLOSE, Die Waffen der alten Araber, p. 69).

[4] LAUFER, *T'oung Pao*, 1908, p. 13.

the Tibetan army of that time:[1] "When the troops go on an expedition, they wear armor consisting of helmets and cuirasses. The latter are made of iron scales[2] or of chains. On the helmet of the cavalry is attached a red crest or a peacock-feather. From their waist hangs a sword, on their back is slung a gun, and in their hand they carry a pike. On the infantry helmet is a cock's feather. They have hanging to their waist a sword, without counting a dirk. Under their arm is a bow and arrow, and in their hand a buckler of rattan or wood. Some also bear a pike in their hand. Their wooden bucklers measure one foot six inches across, and three feet one or two inches in length, and are painted with pictures of tigers, and ornamented with different-colored feathers;[3] outside they are covered with sheet iron."

If the assumption is correct that Tibetan chain mail is Persian in origin, the scale armor would remain to be looked upon as the national body armor of Tibet, at least as the older type which preceded the introduction of chain mail.[4] In former times, it seems to me, the latter was traded over a direct route from Persia into Guge in western Tibet, on the same path along which religious ideas of the Zoroastrians poured in and exerted a deep influence on the shaping of the Tibetan Bon religion, while during the last centuries northern India became the mart which supplied Tibet with this much-craved article.

The Tibetan and Persian relations in matters of arms are expressed also by the identity of the Tibetan and old-Persian sword. Indeed, the Tibetan sword, as still in use at present, is the same as that reconstructed by J. DE MORGAN[1] after a bas-relief of Takht-i-Bostān, both in its shape and in the style of its decoration, for which inlaid stones were employed. The history of the sword, however, is somewhat different from that of chain armor, and is not connected with an importation of swords from Persia into Tibet. The swords of the Turkish tribes of Central Asia, to which the Tibetan swords are related, must be taken equally into consideration; and it seems that this type of sword is a common property of the whole group, of such great antiquity that the accurate history of its distribution can no longer be traced.[2]

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[1] Rockhill, *Journal Royal Asiatic Society*, 1891, p. 215.

[2] Mr. Rockhill has, "made of linked willow-leaf (shaped iron plates)." But the expression *liu ye* ("willow-leaf"), as we see from the regulations of the Ming dynasty, refers to scale armor, not to plate armor. Mr. Waddell (Lhasa and its Mysteries, p. 168) speaks of cuirasses consisting of small, narrow, willow-like leaves about an inch and a half long, threaded with leather thongs, still worn by Tibetan soldiers, a few of whom also wear coats of chain mail. The Chinese physician Dr. Shaoching H. Chuan, who visited Lhasa with the Chinese Mission to Tibet in 1906–1907 has written a very interesting and well-illustrated article on Lhasa under the title The Most Extraordinary City in the World (*Nat. Geogr. Mag.*, 1912, pp. 959–995); on pp. 978 and 980 are good illustrations of Tibetan soldiers wearing chain mail.

[3] In the Tower Armory there is a shield of the Angami-Naga, faced with bear-skin, the side ornamented with tufts of feathers (Hewitt, Official Catalogue of the Tower Armories, p. 100). Compare p. 210.

[4] In ancient India, likewise, scale armor seems to represent the older type. The *Çukranīti* describes solely this type of armor by saying that "armor consists of scales of the breadth of a grain of wheat, is of metal and firm, has a protection for the head, and is ornamented on the upper part of the body" (G. Oppert, On the Weapons, Army Organization, and Political Maxims of the Ancient Hindus, p. 109, Madras, 1880). A suit of Tibetan scale armor is illustrated by A. Georgi (Alphabetum Tibetanum, Rome, 1762, Plate IV) in the figure of a shaman, entitled *cio kion* (that is, *c'os skyong*, "protector of religion").

The Tibetans make (or rather, made) use also of the circular and convex rhinoceros-hide shield of Indian manufacture, ornamented with four brass bosses (Plate XXVII, Fig. 1).[3] This shield is employed likewise in Burma and Siam. The national Tibetan shield is made from rattan plaited in the basketry style of circular coils (Plate XXVII, Fig. 2). Of what type the shield of the ancient Tibetans (K'iang), adopted by the Chinese, was (p. 188), we do not know.

Also the Tibetan helmet (Plate XXVIII), composed of steel sheets incrusted with gold and silver wire, forming floral designs, and with attached coif of mail and sliding nasal, is of Indo-Persian origin (compare Plate XXV).

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[1] Mission scientifique en Perse, Vol. IV, p. 321 (Paris, 1897). Compare this volume, p. 15.

[2] The swords represented on the monuments of Turkistan belong to the same type (see A. GRÜNWEDEL, Altbuddhistische Kultstätten, pp. 26, 27, and many other examples).

[3] For Indian specimens see W. EGERTON, An Illustrated Handbook of Indian Arms, pp. 95, 111, 118, 134 (London, 1880). Rhinoceros-hide shields are mentioned in the *Ain I Akbari* of Abul Fazl Allami (translation of H. S. JARRETT, Vol. II, p. 281, Calcutta, 1891).

V. THE PROBLEM OF PLATE ARMOR

> "The skilful leader subdues the enemy's troops without any fighting; he captures their cities without laying siege to them; he overthrows their kingdom without lengthy operations in the field. With his forces intact he will dispute the mastery of the Empire, and thus, without losing a man, his triumph will be complete."
>
> SUN-TSE, *Art of War* (translation of LIONEL GILES).

We had occasion to allude to plate armor[1] in the chapter on defensive armor of the Han period, stating that in all probability it existed in the China of those days; we referred also to its possible occurrence among the armor worn by the *cataphracti* of the ancients, and figured a Siberian petroglyph from the Yenisei representing a mounted lancer clad with such mail. We now propose to discuss this problem in detail,—a problem of fundamental historical importance, as it reveals ancient relations between many peoples of Asia, and touches also the question as to the connection of Asiatic with American cultures. Classical and other archæologists have not yet ventilated this problem, apparently for the only reason that they did not sharply enough discriminate between the various types of body armor. "Scale armor" was the catchword under which everything of this sort was pressed together.[2] But plate armor must be strictly differentiated from scale armor as a special type, which sprang up independently. The laminæ forming plate armor are rectangular and flat, and mutually lashed together; and in the same manner the parallel horizontal rows are connected one with another. Such connection is absent in scale armor, in which each scale is individually treated and attached to a background; the background is in this case a necessity, while in plate armor it is dispensable. The laminæ of scale armor are arranged like roofing-tiles or the scales of a fish, one placed above another; while in plate armor the laminæ, as a rule, are disposed one beside another, or but slightly overlapping. Plate armor is more flexible and lighter in weight, and hence recommended itself to all nations who became acquainted with it. Plate armor can be easily donned over or beneath any garment, and does away with the uncomfortable leather jerkin. For this reason it proved the most favorite and enduring type of armor in China. It was capable of development and refinement, while scale armor always remained stationary.

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[1] The word "plate armor" is used here throughout in the sense adopted by American ethnologists, — armor consisting of horizontal rows of narrow, rectangular laminæ (regardless of the material), the single laminæ or plates being mutually lashed together by means of thongs, and the various rows being connected in a similar manner. Students of European armor usually take the term "plate armor" to designate armor composed of large sheets of metal closely enveloping chest and back. This type is here styled "sheet armor."

[2] In England, plate armor is usually styled "scale armor." E. H. MINNS (Scythians and Greeks, p. 74, Cambridge, 1913), for instance, speaks of "a system of thongs plaited and intertwined as in Japanese and Tibetan scale armor." This, of course, is plate armor; scales are never intertwined.

It is the ethnologists who were the first to place us on the track of this subject; and there are chiefly two scholars, Friedrich Ratzel and Walter Hough, who took the leadership in this research. Our best course will therefore be to begin by reviewing their studies of the subject, and then to see how their results compare with the new material now at our disposal.

FRIEDRICH RATZEL[1] was the first to make a thorough investigation of the geographical dissemination of plate armor, as far as the material was accessible in his time (1886), among the tribes of north-western America and the Chukchi, also on the Society, Austral, and Gilbert Islands in the South Sea. He was particularly struck by the observation that such armor was lacking in other parts of the world, and that its appearance in the Arctic regions was out of proportion to the general poverty of culture there prevailing. The belief in its independent existence among these peoples conflicted with his axiom that the indolence of inventive power is a fundamental law of the primitive stages of ethnic life. In order to explain the phenomenon of plate armor, Ratzel had recourse to Japan, where he deemed armor had reached its greatest development,[2] and where the threads of ancient tribal connections indicated by these peculiar productions ran together; and he believed in a direct contact between Japan and the north-west coast of America in the distribution of plate armor, to the exclusion of the Asiatic Continent. Although the result of this investigation is seemingly historical, the methods and the point of view pursued are purely geographical; and an historical mind cannot fail to notice the weak points of this argumentation. The existence of plate armor in Japan, for instance, is merely accepted as a fact given in space, without inquiry into its historical foundation and development, and without the knowledge of corresponding objects in China and other parts of Asia being much older.

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[1] Über die Stäbchenpanzer und ihre Verbreitung im nordpazifischen Gebiet (*Sitzungsberichte der Bayerischen Akademie der Wissenschaften*, 1886, pp. 181–216; 3 plates).

[2] H. SCHURTZ (Urgeschichte der Kultur, p. 355) has adopted the opposite point of view, and interprets that the curious plate armor characteristic of the peoples of the Bering Sea has served as model for the Japanese armor made from lacquered pieces of leather, as certain traditional decorations in the former also seem to prove. This opinion is out of the question, for technical and historical reasons.

WALTER HOUGH, in his intensely interesting and valuable study "Primitive American Armor,"[1] arrives, after a careful survey of the subject, at the conclusion that "plate armor in America is a clear case of the migration of invention, its congeners having been traced from Japan northeastward through the Ainu, Gilyak,[2] and Chukchi, across Bering Strait by the intervening islands to the western Eskimo. Here the armor spread southward from the narrowest part of the strait, passing into the slat armor of the North-west Coast, which is possibly a development of the plate idea. The plate armor also may have spread to the eastern coast of North America. Hence, it appears to be conclusive that plate armor in America had Asiatic origin." On p. 633 Dr. HOUGH states as follows: "The hoop or band armor mentioned as type 4 is found only on the Siberian side of this area and, as well as the plate armor, recalls well-known forms in Japan. This hoop armor is interesting as showing the reproduction of plate armor types in skin, being made of horizontal bands of sealskin instead of rows of ivory plates, the rings telescoping together when the armor is not in use." In describing Eskimo armor made of five imbricating rows of plates of walrus ivory, Dr. HOUGH observes that in the form, lashing, and adjustment of the plates it is identical with certain types of Japanese armor.[1] His conclusions are the more remarkable, as the previous investigation of Ratzel was unknown to him, and his result has apparently been attained independently. We are here confronted with the interesting case that two ethnographers of high standing have made a notable and praiseworthy attempt to apply an historical point of view to a purely ethnographical situation, with a result so tempting and seemingly convincing that some of the best representatives of our science have readily accepted it.[2] But in the light of a plain historical fact, the position taken by Ratzel and Hough in this question becomes untenable.[3]

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[1] *Report of the U. S. National Museum for 1893*, pp. 625–651 (Washington, 1895; 22 plates).

[2] This is a debatable point. J. BATCHELOR (The Ainu of Japan, p. 287, London, 1892) says, "The Ainu also wore armor in their wars; but it was of a very light kind, consisting entirely of leather. Some of them, however, wore Japanese armor which they took from the dead in warfare. This is also one way in which they came by their swords and spears." It seems quite certain that the Ainu have never made any plate armor; and what is found among them of this class is plainly derived from the Japanese. Nor can the Gilyak be credited with plate armor. The only specimen of iron plate armor ever discovered in this tribe, and figured and described by L. v. SCHRENCK (Reisen und Forschungen im Amur-Lande, Vol. III, p. 573), is, as SCHRENCK says, of Manchu origin; and he adds expressly that the iron armors, according to the *unanimous statement of the Gilyak*, originate from the Manchu. Dr. HOUGH, who has reproduced Schrenck's drawing of the helmet and of a piece of the armor, seems to have overlooked the description in Schrenck's text, though also on the plate the attribute "old Manchu" is added to both specimens, in contradistinction to the indigenous real Gilyak armor coat plaited from fibre. The Gilyak, therefore, cannot be cited, as Dr. HOUGH has done, as a stepping-stone in the migration of plate armor from Japan to the Eskimo. Also Mr. BOGORAS (The Chukchee, *Jesup North Pacific Expedition*, Vol. VII, p. 164), whose exactness and carefulness is otherwise deserving of the highest praise, has fallen into the same error by reproducing and describing Schrenck's drawing as "Gilyak armor," without paying attention to Schrenck's text. If, therefore, the statement of Bogoras should be correct, — that the shape of the plates, and the manner of connecting them, in an iron armor of the Chukchi, are quite similar to those observed on the remnants of this "Gilyak armor," — this would seem to say that the Chukchi armor in question would have to be connected with Chinese, and not with Japanese culture, as Mr. BOGORAS is tempted to believe; it will be seen on the following pages that other weighty reasons militate strongly against this Japanese theory. SCHRENCK, beyond any doubt, is correct in his statement; and his result agrees with my own inquiries among the Gilyak for armor, and also with my study of Chinese armor. Only SCHRENCK's definition of "Manchu" must be modified into "Chinese." This error is excusable, as any investigation of Chinese armor had not been made in his time. The Manchu cannot be credited with any original invention in the matter of armor: they adopted it, like so many other things, from the Chinese; and it can be shown step by step, substantiated by official documents, that the Manchu, as in numerous other matters, have also faithfully copied the military equipment established by the Ming dynasty. There is no Manchu type of armor which has not yet existed in, and could not be derived from, the Ming period. SCHRENCK's Gilyak armor, accordingly, is plainly a modern Chinese specimen, that must forfeit any claim to the historical utilization, to which it has been submitted; it cannot be brought into relation with Japan, nor with the Chukchi, nor with the Eskimo. This ethnographical continuity asserted by HOUGH cannot be proved, nor does it in fact exist. RATZEL (*l. c.*, p. 214) had justly emphasized the entire lack of plate armor among the peoples of Yezo, Saghalin, and the adjacent mainland. Thus the Japanese theories of Ratzel and Hough, though reaching the same end, materially differ in point of construction.

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[1] Compare also HOUGH (*American Anthropologist*, Vol. XIV, 1912, p. 40).

[2] BOGORAS (*l. c.*, p. 162), for instance, seems to accept Hough's results; the Chukchi hoop armor is, to him, "evidently an imitation in skin of plate armor" (repeated after HOUGH, p. 633). R. ANDREE (*Globus*, Vol. 69, 1896, p. 82) acceded to the theory of Hough.

[3] This case well illustrates the difficulty of historical reconstructions built exclusively on the basis of observed data of purely geographical and ethnographical character. As soon as the light of authenticated historical facts is obtained, our preconceived assumptions and conclusions will always be subject to considerable modifications. In my opinion it is therefore impossible to elaborate with assured results historical reconstructions founded on purely ethnological data. Our mind, owing to our scientific training, can evolve only a logical sequence of thoughts, and interpret given data in a highly logical manner only; but history itself is not logical; on the contrary, it is irrational and erratic, moving in zigzag lines, like lightning; it is a labyrinth of dark passages running in all directions; and, above all, it is more imaginative than the boldest flight of our fancy could possibly be. The unexpected, the unforeseen, has always happened; and this is what cannot be supplied or supplemented by the logic of our rational mind. Reconstructions certainly are justifiable and should be attempted, but must never be taken as a substitute for history, or even as real history; they will always remain more or less subjective and problematical, and may be of value as a working hypothesis. It should never be forgotten, however, that the subjective criterion of conceivableness or plausibility, or of an appeal to our common sense, will but seldom prove before historical facts. The rule may even be laid down that whatever may appear to our conception as quite natural, self-evident, or logical, may hardly ever have happened that way, or need not have happened that way, but otherwise. Our knowledge of most subjects is still too meagre to allow at the present time of culture-historical reconstructions embracing a wide area of the globe. To these belongs also the theme of plate armor, the specific history of which must first be traced in the single culture zones where it occurs, before its general history can be built up with any encouraging result. Plate armor

In the north-east of China, beyond the boundaries of Korea, in the east conterminous with the ocean, the northern limit being unknown, we find from very remote ages the habitat of a most interesting people, the Su-shên, who have greatly stirred the imagination of Chinese and Japanese chroniclers. They were the Vikings of the East, raiding on several occasions the coasts of northern Japan, and fighting many a sea-battle with the Japanese in the seventh century.[1] For a thousand years prior to that time, the Chinese were acquainted with this tribe and its peculiar culture: even Confucius is said to have been posted in regard to them, and to have been aware of the fact that they availed themselves of flint arrowheads, usually poisoned, which were then preserved as curiosities in the royal treasury of China. From Chinese records we can establish the fact that the Su-shên lived through a stone age for at least fifteen hundred years down to the middle ages, when they became merged in the great flood of roaming Tungusian tribes. They had also stone axes, which played a rôle in their religious worship. A mere supposition is that they belonged to the Tungusian stock of peoples; yet this remains to be ascertained. They may as well have been related to one of the numerous groups of tribes occupying ancient Korea, or, which is still more likely, to the so-called Palæ-Asiatic tribes of the North-Pacific region; but the whole ancient ethnology of north-eastern Asia remains as yet to be investigated.

Under the year 262 A.D. it is on record in the Annals of the Three Kingdoms[2] that the Su-shên presented to the Court of China a tribute of a mixed lot of harness, altogether twenty pieces, including armor made of leather or hide, of bone, and of iron, with the addition of four hundred sable-skins.[3] On the iron armor, which was foreign to the culture of the

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certainly is not by any means so rigidly restricted as assumed by Ratzel and Hough; it will be seen that it takes its place in China, western Asia, ancient Siberia and Turkistan, where it is assuredly much older than in Japan.

[1] Compare Jade, p. 59. The Han Annals state that the Yi-lou, another name for the Su-shên, were fond of making piratical raids in boats; the Wo-tsü settled in the north-eastern part of Korea, and bordering in the south on that tribe, "dreaded it so much that every summer they were wont to hide in the precipitous caves until winter, when navigation was impossible, at which time they came down to occupy their settlements" (E. H. PARKER, *Transactions Asiatic Society of Japan*, Vol. XVIII, 1890, p. 201). In the same study of Parker (pp. 173 *et seq.*) a history of the Su-shên will be found.

[2] *San kuo chi*, *Wei chi*, Ch. 4, p. 13 a (compare *T'oung Pao*, 1913, p. 347).

[3] I am inclined to understand this passage in the sense that there were three distinct kinds of armor, made entirely either of leather, or of bone, or of iron. It is impossible to presume that bone was used in connection with iron in the make-up of one and the same suit of armor. The iron armor, we are forced to conclude, must have formed an individual type in itself, and assuredly one alien to the culture of the Su-shên, who, we know with certainty, were not acquainted with the technique of metals for an extended period, and availed themselves of flint arrowheads. Before going to press, I notice from the work of R. and K. TORII (Études archéologiques,

Su-shên, I shall comment later. Hide armor and bone armor formed the national harness of the Su-shên, as we may infer from another memorable passage in the Annals of the Tsin Dynasty[1] relating to the period 265–419 A.D., where the characteristic arms of the tribe are enumerated as wooden bows, stone crossbows, hide and bone armor.[2] It is remarkable that the Chinese do not ascribe bone armor to any other of the numerous tribes, with whom they became familiar during their long history, and whose culture they have described to us. In all likelihood, the term "bone armor" occurs in their records only in those two passages; and it is not at all ambiguous. There is but one thing that can be understood by it, — the well-known type of bone armor, as it still occurs among the tribes occupying the northern shores of the Pacific on the Asiatic and American sides, particularly among the Chukchi and Eskimo, and in that region exclusively.[3] The Eskimo ivory plate armor represented on Plate XXIX will give some idea of what the Su-shên

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Journal of the College of Science, Vol. 36, Tōkyō, March 29, 1914, p. 73), which has just reached me, that the two Japanese authors understand this passage in exactly the same sense.

[1] *Tsin shu* (compiled under the T'ang dynasty by Fang K'iao and others), Ch. 97, p. 2 b.

[2] The question in this passage, accordingly, is of the armor, offensive and defensive, possessed and made by the Su-shên in the beginning of the middle ages. Hide and bone armor are attributed to them, while iron armor is not mentioned. The text might be construed to mean that the Su-shên possessed but a single type of armor, composed of both bone and leather; that is, plates of bone lashed together by means of hide thongs; bone armor is unthinkable without such a ligament, but this consideration need not preclude the assumption that the Su-shên fabricated also pure hide armor. The ethnographical fact that in the culture-area to which this tribe belonged hide and bone armor still occur side by side, must be equally considered in this question; and for this reason we may well understand the passage of the Tsin Annals in the sense that the Su-shên had hide or leather armor, and bone armor. But this point of view is of minor importance. The same passage in the *Tsin shu* indicates a tribute sent by the Su-shên toward the end of the period King-yüan (260–264) and consisting of arrows, stone crossbows, armor, and sable-skins. What kind of armor it was on this occasion is not specified; but the general word *kia* refers to a hide armor or cuirass. J. KLAPROTH (Tableaux historiques de l'Asie, p. 85) attributes "cuirasses made from skin and covered with bone" to the Yi-lou; the latter are identical with the Su-shên, and the text from which Klaproth translated must be the same as that of the *Tsin shu* referred to above. The text relative to the Yi-lou inserted in *Hou Han shu* (Ch. 115, p. 2 b) makes no allusion whatever to armor, but I am not inclined to infer from this silence that the Yi-lou or Su-shên lacked armor in the Han period.

[3] As stated by me in *T'oung Pao* (1913, p. 349), the plates of this bone armor were presumably carved from walrus ivory, in the same manner as in the present Eskimo and Chukchi plate armor. Dr. W. HOUGH of the U. S. National Museum in Washington, to whom I addressed the question as to whether ivory or ordinary bone was utilized to a larger extent in these pieces has been good enough to write me as follows: "The Eskimo armor in the Museum and such suits as I have seen are mostly made of walrus ivory, and so far as I can remember, there are no combinations of ivory and bone in the same piece. On the other hand, there are fragmentary parts of armor from St. Lawrence Island and from the Alaskan mainland which are made of bone; just what bone I cannot say, probably the whale."

tribute armor was like.[1] The point here at issue, then, is the fact that the entry of the Chinese annalist, under the year 262, regarding the presentation of bone armor on the part of the Su-shên, is the earliest recorded reference to bone armor in history, capable of throwing a flashlight on events in the North-Pacific culture area, so glaringly devoid of any records.

The date 262 is of far-reaching consequence. Certainly, like all dates where inventions or culture ideas are involved, it is a mere symbol, that requires a certain latitude in its translation. The tribute of 262 indicates that bone armor had been made prior to that date by the Su-shên, or generally within the culture-zone to which they belonged; and since complex inventions of such character require time to mature, and the laborious efforts of several generations, it is justifiable and reasonable to conclude that the beginnings of the invention go back to a far earlier period. Plate armor of bone must therefore be infinitely older than could heretofore be supposed from the mere circumstantial evidence of present geographical distribution; and it follows also that the geographic area of bone armor must have been much more extended in ancient times, and reached farther south along the shores of Asia. In other words, the culture area under consideration, as it now presents itself to our eyes, must have occupied a larger territory in the times of which we speak, — a conclusion confirmed to me also by other reasons; and the Su-shên must have either ranged among the representatives of North-Pacific culture, or have been strongly influenced by it. If as early as 262 the Su-shên were in possession of bone plate armor, this type of harness cannot be explained as having been made in imitation of Japanese plate armor — for the plain reason that Japanese plate armor was at that time not in existence. Metal armor in Japan cannot be pointed out before the close of the eighth century. Fragments of armor consisting of scales of bronze incrusted with gold, and preserved in the Museum of Tōkyō, are assigned to about the year 800 A.D. by BASHFORD DEAN,[2] our great authority on Japanese armor; while fragments of iron plate armor are not older than about 1050 and 1100; that is, they belong to the latter part of the Fujiwara period (900–1100). Before this time, padded coats and hide cuirasses were the usual means of body protection; the latter sometimes assumed the form of scale armor, the scales being cut out of pieces of boiled leather.[1]

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[1] The number of perforations in the plates is not always six, as in the specimen illustrated. A large number of detached Eskimo ivory plates in the Field Museum (Cat. No. 34,154) exhibits on an average twelve perforations, two and two being close together. Sometimes a third perforation is added to the two in the corners, and sometimes an additional perforation is drilled through the centre of the upper or lower side. A very interesting specimen in our collection (Cat. No. 34,153) is a pair of Eskimo cuisses (leg-guards) of mastodon ivory, 16.5 cm long, with rows of perforations along the top and bottom edges. These objects were obtained by A. M. Baber from the Asiatic Eskimo on the Tchukotsk Peninsula.

[2] Catalogue of the Loan Collection of Japanese Armor, pp. 20, 28 (New York, 1903).

The Chinese Annals of the Sui Dynasty,[2] in the interesting account on Japan, state that the Japanese (Wo) make armor of varnished leather (*tsi p'i wei kia*) and arrows of bone. At that time, which, from the standpoint of Japanese development, is designated as the protohistoric or semihistoric period, defensive armor cannot have played any significant rôle in ancient Japan, as it is conspicuously absent in her two oldest records, the Kōjiki (composed in 712 A.D.) and the Nihongi (720 A.D.).[3] In the year 780 an order was issued by the government that leather armor should be used, because the kind hitherto worn (that is, padded coats) was continually requiring repair. This order permitted, further, the use of iron instead of leather, and advised that all armor should be gradually changed to metal.[4] It is therefore clear that at the time, when our Su-shên account of bone armor is at stake, the Japanese did not possess any metal or any plate armor, and that it is even questionable whether they then availed themselves of defensive armor at all. We are hence prompted to the conclusion that bone plate armor, being at least from six to eight hundred years older than Japanese plate armor, cannot have been made as a reproduction of the latter, and that Japan cannot be made responsible for it. Thus the whole theory of a connection of American and Northeast-Asiatic plate armor with Japan must naturally collapse.

If the opinion should be correct of those who believe that American-Asiatic plate armor must have been made in imitation of a form of iron armor, two other theoretical considerations could be advanced. There remain the Chinese and the ancient Turks of Siberia and Central Asia; and it might be argued that Chinese or Siberian harness of iron plate could have furnished a suitable model for the Arctic harness-maker. To such a point of view, however, serious objections could be raised; and here again, first of all, on purely historical grounds. The utilization of iron in the making of armor, as we noticed in Chapter III, does not become apparent in ancient China till as late as the first centuries of our era, its beginnings being justly laid by the Chinese in the period of the Later Han dynasty (25–220 A.D.; see p. 210), and thus it appears from inward evidence. This primeval iron armor, in all likelihood, was not yet a true iron plate armor, but merely a hide cuirass reinforced by iron laminæ; rectangular iron plates may have then existed, but the matter is still problematical. Even presuming that iron plate armor might have obtained during the epoch of the Later Han, for which there is as yet no positive evidence, we should be forced to infer that the developments of the ancient Chinese iron armor and the northern bone armor, in this case, have necessarily been contemporaneous events. The tribute of the Su-shên bone armor in 262 A.D. is separated from the closing year of the Han period in 220 A.D. only by the brief span of forty-two years; that is, the average duration of a generation. If, accordingly, these two developments should have run parallel to each other in point of time in two widely different culture areas which otherwise had not a single point in common, the inference would have to be drawn that these two developments have taken place independently, and may have each been prompted by factors coming from a different quarter. In the present state of our knowledge it is safe to assume that bone armor in north-eastern Asia is as old as, or even older than, any iron plate armor in China or Korea.

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[1] Catalogue of the Loan Collection of Japanese Armor, p. 38 (New York, 1903). According to W. GOWLAND (The Dolmens and Burial Mounds in Japan, p. 47, Westminster, 1897), no bronze armor has as yet been found in the dolmens of Japan; and iron armor, too, is by no means of very common occurrence.

[2] *Sui shu*, Ch. 81, p. 6 b (also *Pei shi*, Ch. 94, p. 72). It is notable that the account of Japan in the Annals of the Later Han Dynasty (Ch. 115, p. 5 b) makes no mention of body armor, but points out only the shield and the use of offensive weapons, such as spear, wooden bow, and arrows with bamboo shafts and bone heads. Arrows with iron heads employed in Japan are first reported in *Tsin shu* (Ch. 97, p. 3).

[3] O. NACHOD, Geschichte von Japan, Vol. I, p. 155 (Gotha, 1906). But shields are several times mentioned as offerings. The Annals of the Later Han Dynasty, as pointed out, confirm the existence of shields. The idea generally entertained that Japan has had a bronze and an iron age, in my opinion, is erroneous. The bronze and iron objects found in the ancient graves have simply been imported from the mainland, and plainly are, in the majority of cases, of Chinese manufacture. Many of these, like metal mirrors, certain helmets and others, have been recognized as such; but through comparison with corresponding Chinese material, the same can be proved for the rest. Ancient bronze objects are so scarce in Japan that, even granted they were indigenous, the establishment of a "bronze age" would not be justified, nor is there in the ancient records any positive evidence of the use of bronze.

[4] BASHFORD DEAN, *l. c.*, p. 27.

If an outward impetus to the making of bone armor in that region must be assumed, I am disposed to believe that it came from the interior of Siberia.[1] In regard to ancient Siberian armor, our information is exceedingly scanty. Only traces of plates of armor have been discovered in graves on the Berel,[2] and a famous petroglyph on the Yenisei depicts to us a horseman armed with lance and mail-clad (Fig. 35). The long continuity of the iron age in Siberia renders it impossible at the present time to fix a date for these antiquities with any degree of certainty; but a general deduction may be hazarded. There are good reasons for assuming that the Chinese derived their iron armor from Turkish and Iranian peoples,— first, because their knowledge of smelting and forging iron came from them; and, second, because their own inventiveness in defensive and offensive armor was rather poor, and because others of their weapons, like swords and daggers, were adopted from the same group (p. 215). The sudden appearance of iron armor in the Later Han dynasty speaks in favor of this view; and as only copper plate armor was known in the preceding period of the Former Han dynasty, it seems very likely that iron armor among the Turkish tribes was not much older than in China. As previously stated, the Su-shên sent iron armor along with skin and bone armor to China, but only the latter two types formed their national armor, according to the later report of the Annals of the Tsin Dynasty. The occasional introduction of iron armor, consequently, did not suppress among them the employment of skin and bone armor; and although iron armor was known to them at the end of the third century, they adhered, for several centuries downward, to bone and hide, that seem to have represented a more efficient means of defence at that time than iron armor, the making of which must still have been in a primitive and experimental stage. On the other hand, in opposition to this theory of a foreign influence, it must be emphasized that the culture types of north-eastern Asia, on the whole, have strong and pronounced characteristics which have hardly any parallels in the rest of the Asiatic world, and that owing to geographical conditions the entire area has remained purer and more intact from outside currents than any other culture group in Asia. The profound researches of Bogoras and Jochelson have shown us that in language, folk-lore, religion, and material culture, the affinities of the Chukchi, Koryak, Yukagir, and Kamchadal go with Americans, not with Asiatics. In fact, Turkish-Mongol influence on these tribes is exceedingly small; Chinese influence, if any, amounts to a minimum;[1] and the alleged Japanese influence is a chimera. Plate armor, if due in that region to a stimulus received from outside, would represent a somewhat isolated instance of historical contact in the line of warfare;[1] and whatever the psychology of this first stimulus may have been, — I venture to deny that it ever operated in the haphazard and purely external manner indicated by Ratzel and Hough, — a certain independent course of development in that area cannot be absolutely denied.

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[1] For evidence see below, p. 274.

[2] W. RADLOFF, Aus Sibirien, Vol. II, p. 130. Also in Siberia iron armor may have formed the exception, while hide, as the cheaper material, always maintained its place. MARCO POLO (ed. of YULE and CORDIER, Vol. I, p. 260) says concerning the Tartar (that is, Mongol) customs of war, "On their backs they wear armor of cuirbouly [boiled leather], prepared from buffalo and other hides, which is very strong."

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[1] While the Chinese, owing to political circumstances, were comparatively well acquainted with the tribes inhabiting Manchuria, Korea, and the Amur region, their knowledge of the tribes beyond has always been very limited. Their first acquaintance with the Ainu dates from the year 659 A.D., when some members of this tribe accompanying a Japanese embassy made their appearance at the Court of the Emperor Kao-tsung (650–683) of the T'ang dynasty; they are described on this occasion as "forming a small country on an island in the ocean, having beards four feet long, being clever archers, and sticking arrows through their hair; they have a man hold an arrow (according to another reading, a vessel) which they use as a target at a distance of ten paces, without missing their aim" (*T'ang shu*, Ch. 220, p. 11; and *Yen kien lei han*, Ch. 231, p. 47). They are called by their Japanese name *Yemishi* (Chinese, *Hia-i*). This embassy is mentioned under the same year also in the Japanese *Nihongi* (ASTON, Nihongi, Vol. II, p. 260), where it is said that the

While I am very far from contesting that historical interrelations may have been at play in the dissemination of the plate idea in north-eastern Asia, I wish to maintain for the present an attitude of reserve toward this point. The downright failure of the Japanese hypothesis should put us on our guard; and, the imitation theory, I confess, be it formulated with reference to the Japanese, Chinese, or Siberians, does not strike me very favorably. Whatever we may now be inclined to assume in that direction, it will remain mere assumption in our present state of knowledge; and it must be upheld that no imitation theory, with whatever modifications, can be backed up by certain facts. In other words, the problem is not yet susceptible of a definite solution. There is, however, not only an historical, but also a technical side to this question, and we should not entirely lose sight of the technical point. We observe in various culture-groups that plate armor is never a primary type of armor, but occupies a secondary place in point of

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Japanese took with them a Yemishi man and woman of Michinoku to show to the T'ang Emperor. In the Description of the Tributary Nations of the Ts'ing Dynasty (*Huang Ts'ing chi kung t'u*, Ch. 3), published under the patronage of the Emperor K'ien-lung, the Ainu are figured and briefly characterized under the name *K'u-ye*. This is the Gilyak designation *Kuhi* for the Ainu, identical with the *Huye* of Du Halde (Description de l'empire de la Chine, Vol. IV, p. 15; compare also L. v. Schrenck, Reisen und Forschungen, Vol. III, p. 129). On some Chinese maps Saghalin is still designated as "Island of K'u-ye." The Gilyak came to the notice of the Chinese at a very late date; they do not seem to be mentioned earlier than in the *Se wên hien t'ung k'ao* (published in 1586) under the name *Ki* (or *K'i*)-*li-mi* (Gilămi), the name given this people by its Tungusian neighbors (compare A. Wylie, Chinese Researches, pt. 3, p. 249, who alludes to this passage without identifying the tribe). In the Chinese work previously quoted, the Gilyak are pictured and described under the term *Fei-ya-k'a* as inhabiting the country to the extreme east of the Sungari, the littoral of the ocean, and scattered over the islands (compare L. v. Schrenck, *l. c.*, pp. 100–103).

[1] A very interesting case was established by Franz Boas in his study Property Marks of Alaskan Eskimo (*American Anthropologist*, 1899, pp. 601–613). Property marks are very frequently used by these tribes on weapons employed in hunting with the object of securing property-right in the animal in whose body the weapon bearing the mark is found. It is a remarkable fact that these marks occur only among the Eskimo tribes of Alaska, but are not known from any other Eskimo tribe. This fact, taken in connection with the form and occurrence of such marks among the north-eastern tribes of Asia, suggests to Boas that this custom, like so many other peculiarities of Alaskan Eskimo life, may be due to contact with Asiatic tribes. This case is very plausible, and would merit a more profound historical investigation in connection with the practice of *tamga* now disseminated throughout Siberia.

time; it is always preceded by plainer types, usually cuirasses of hide or cotton, and scale armor. Cuirasses of rhinoceros-skin were utilized in China for thousands of years, before any metal harness became known. In China as well as in Egypt we clearly recognize the intermediary stages of hide and plate armor, the surface of the hide being first reinforced by irregular, scale-like metal pieces (first of copper, later of iron), which gradually assumed the standard rectangular plate shape; and then, by removing the hide foundation, the pure metal plate armor sprang up as a new and independent type. The history of defensive and offensive weapons, moreover, is closely interrelated; the eternal game of modern war industry — first inventing bullet-proof naval armor-plates, and then the bullets to pierce them — was in full swing even in the stages of primitive life. The growing perfection of metal weapons constantly forced man to devise new means of increasing the power of his defensive armor, and this accounts for the coming into existence of ever-varying new types. I am certainly not competent on any subject of American ethnology, and must leave it to our Americanists to reason out the case for themselves. But this much may be said. Nearly everywhere in North America, even in the eastern area, we generally find the type of hide armor, the indigenous development of which is admitted by Dr. Hough and cannot seriously be challenged; thus hide armor may have been the oldest form of body protection in war also in this region.[1] We meet there also the intermediary stages, as, for instance, the wooden cuirass of the Thompson River Indians, covered with elk-hide, described by JAMES TEIT,[2] and the application of wooden slats, of reeds, of bone plates to the exterior or interior of the cuirass, to strengthen it more efficiently, — the secondary development. Finally those materials were exclusively utilized in its construction, leading up to pure plate armor as a tertiary and ultimate stage. No fundamental difference can be found in the employment of wood and bone, or ivory, which simply present purely technical changes of material; and American-Asiatic bone plate armor, after all, might be conceived as quite a natural development, which may have arisen independently, without the contact of an outside culture. Its coming into existence could be explained by the trend of indigenous thought and the inventiveness of the aborigines, which may have resulted in a large variety of ingenious armor spread over an extensive area.[1]

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[1] "The American savages were acquainted with body armor when they were first encountered. Wherever the elk, the moose, the buffalo, and other great land mammals abounded, there it was possible to cover the body with an impervious suit of raw-hide" (O. T. MASON, The Origins of Invention, p. 390).

[2] The Thompson Indians of British Columbia (*Jesup North Pacific Expedition*, Vol. II, p. 265). See also A. P. NIBLACK, The Coast Indians of Southern Alaska (*Report U. S. National Museum*, 1888, pp. 268–270).

There remain other considerations to be made which would seem to confirm this impression. The cut, the style, and the mode of wearing armor in the North-Pacific region are different from those in eastern Asia. The peculiar Chukchi fashion of having the left side covered up and the left arm and hand hidden in the armor, while only the right arm remains free for action,[2] is a striking feature, which is entirely lacking in any other part of Asia. At any rate, I am inclined toward the opinion that the type of bone plate armor under consideration is not exclusively due to an impact of foreign influence. In some form unknown to us it may have pre-existed, before any metal plate armor had reached the Far East; while I am quite willing to admit that at some later period the regular, rectangular shapes of the ivory plates, and the peculiar method of lashing them together, may be the outcome of an adaptation to some imported model.

The memorable passage in the Chinese Annals concerning the Su-shên may elucidate still another problem. Their gifts to China in 262 consisted not only of bone armor, but also of iron armor. BOGORAS[3] has shown that ancient iron armor, made of small pieces of iron with fastenings of narrow leather strips, was until recently very common among the Reindeer Chukchi; and he makes it probable that iron was known among them before the arrival of the Russians. And here the Su-shên come again to our assistance in dispelling the Japanese spectre; for the question of the origin and manufacture of Chukchi iron armor suggests to Mr. BOGORAS "a connection with the Japanese which does not exist at present,"— and which in all probability has never existed. Mr. BOGORAS is unable to furnish any evidence for such an alleged intercourse, which is certainly not proved by the occasional occurrence of a modern Japanese article of trade in that region.[4] The facts in the case are that the Japanese never have penetrated much beyond Saghalin Island, where the southern portion inhabited by the Ainu was their main field of exploitation, while the northern part remained a *terra incognita* to them. The Japanese have exerted no influence on the culture of the Gilyak settled there,[1] nor is there any Japanese trace on the mainland in the region of the Amur. Even without such considerations, however, the point of view taken by Bogoras in this matter can no longer be upheld. The fact that the Su-shên possessed knowledge of iron armor in 262 goes to prove that iron armor around that time was within the boundaries of the North-Pacific culture-zone.[2] Again, it must be called to mind that the Su-shên iron armor cannot have been of Japanese origin, as iron armor was not then in existence in Japan; neither can it be set in relation with Chinese iron armor, as it would be absurd to suppose that the Su-shên should have sent Chinese iron armor as tribute to the Chinese Court. Their tribute certainly consisted of curious and valuable objects which were new and impressive to the Chinese. As the Su-shên were not able to make iron armor, not being acquainted with the technique of smelting and forging iron, they consequently must have received it in the channel of trade from an iron-producing region, such as we find in ancient times in the interior of Siberia, in Central Asia,[3] and in the beginning of our era also in

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[1] I do not mean to say, of course, that the development has actually and objectively taken place that way, but only wish to point out that it may be thus construed in our minds.

[2] HOUGH, Plate V; BOGORAS, The Chukchee, p. 163 (shows also a suit of left-handed iron armor).

[3] The Chukchee (*Jesup North Pacific Expedition*, Vol. VII, No. 1, p. 54).

[4] The statement of Bogoras that the armor and helmet figured on p. 164 are Japanese seems to me to require further proof. It rather conveys the impression of being un-Japanese. Bogoras alludes to the advance of the Japanese to Kamchatka without citing sources in support of this opinion. I presume he must have had in mind the passages of G. W. STELLER (Beschreibung von dem Lande Kamtschatka, pp. 3, 249) saying that the Japanese were long known as traders to the inhabitants of the littoral of the Okhotsk Sea (on the Kamchadal name of the Japanese, see L. v. SCHRENCK, *l. c.*, p. 192). Kamchatka was vaguely known to the Japanese of the eighteenth century, as we see from KLAPROTH'S Aperçu général des trois royaumes

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(p. 195, Paris, 1832). The Itälmen, the ancient Kamchadal, knew the Japanese chiefly as importers of iron needles, and styled these *Šis* (plural *Šisin:* I. RADLINSKI, Slownik narzecza Kamczadalów, p. 72, Cracow, 1892) after *Sisam*, the Ainu designation of the Japanese. But it is altogether the simple question of a superficial trading relation along the coast by way of the Kuriles; and there is no trace of Japanese influence whatever on the culture of the Kamchadal.

[1] Likewise L. v. SCHRENCK (Reisen und Forschungen im Amur-Lande, Vol. III, p. 570).

[2] This chapter, as it now stands, was in substance written in the autumn of 1912, an abstract of it having been read at the meeting of the American Anthropological Association held in Cleveland, December, 1912 (see *Science*, 1913, p. 342, or *Am. Anthr.*, 1913, p. 960). A confirmation of the above conclusion is now furnished by the highly interesting study of R. and K. TORII (*l. c.*, p. 72), who found in eastern Mongolia a metal (seemingly iron) plate of an armor (4 × 2.5 cm) with four apertures in the long sides. It is correctly diagnosed by the two Japanese authors, who remark that such plates are now dispersed among the ruins left by the Tung Hu ["Eastern Hu," a general Chinese designation for the populace of eastern Siberia], especially in the region of the Shira Muren. This archæological discovery bears out the fact that iron armor anciently did exist in eastern Siberia, and that it was of the type of plate armor. Thus the supposition is gaining ground that the iron harness in the possession of the Su-shên was iron plate armor, and existed in that region side by side with bone plate armor. Messrs. Torii, in this connection, remind us of the fact that the Wu-huan, according to the Annals of the Later Han Dynasty, are capable of making their bows and arrows, also saddlery, and turn out their own arms from forged iron.

[3] It is known that L. v. SCHRENCK (*l. c.*, Vol. III, p. 569) attributes to Japanese influence the knowledge of iron-forging among the Ainu and Gilyak. This being an affair of recent origin is certainly not a serious case; these tribes purchase Japanese pig-iron, and work it up into blades for knives. Schrenck's point of view that iron-

Korea.[1] These considerations are instructive also in that they reveal the baselessness of what might be styled "the Japanese mirage of American ethnology." Not only objects of material culture like plate armor, but also motives of myth and legend, have been traced from America directly to Japan, as, for instance, by the late PAUL EHRENREICH.[2] This method seems to me inadequate for historical reasons. The primeval culture type of Japan, as we know it, is a comparatively recent production, very recent when contrasted with the great centres of culture developed on the mainland of Asia, and recent even in comparison with all indigenous cultures found on the American Continent. I mean to say that most phenomena of culture, inclusive of myth and religion, are by far older on this continent, and still preserved in an older form, than any corresponding phenomena in Japanese culture, even if the latter are reduced to their oldest attainable condition. The Kōjiki and Nihongi, the main text-books of Japanese mythology, do not present a pure source of genuine Japanese thought, but are retrospective records largely written under Chinese and Korean influence, and echoing in a bewildering medley continental-Asiatic and Malayo-Polynesian traditions. But more than that,—it may be safely stated at the present time that the history of American cultures has never had, and never could have had, any relation with Japan, which always was beyond the pale of American-Asiatic relations, and that American ethnology offers no point of contact with Japan. The threads of historical connection running from America into Asia do not terminate in Japan, but first of all, as far as the times of antiquity are concerned, in a territory which may be defined as the northern parts of modern Manchuria and Korea. From ancient times the varied population of this region has shared to some extent in the cultural elements which go to make up the character-

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forging among the Gold on the Amur is due to the adjoining Manchu-Chinese, however, is entirely erroneous, as this art doubtless is much older in that region than the rule and influence of the Manchu, and points decidedly in the direction of the Turkish Yakut. Many iron objects of an ornamental character in use among the Gold can be plainly recognized as Yakutan in origin, and Yakut are constantly living and trading in their midst. Neither the Japanese nor the Chinese need be invoked to explain iron-forging in eastern and north-eastern Siberia, as it is much older in the interior of Siberia, where there have been at all times better blacksmiths, forging better iron-work than was ever turned out in China.

[1] The Annals of the Later Han Dynasty (*Hou Han shu*, Ch. 115, p. 5 b) relate that the country Shen-han in Korea produced iron, that the Wei, Wo (Japanese) and Ma-han went there to purchase it on the market, and that iron was the means of barter in all business transactions. There was no iron in the country of the Shi-wei, and they received it from Korea in exchange for sable-skins (*Pei shi*, Ch. 94, p. 9 b). The considerable beds of iron ore in Kang-wun Province are still worked by the natives, who scrape it up from the surface of the ground, and smelt it in furnaces by means of charcoal (H. B. HULBERT, The Passing of Korea, p. 274).

[2] Die Mythen und Legenden der südamerikanischen Urvölker, pp. 77 *et seq.* (Berlin, 1905).

istics of the North-Pacific culture-province. It does not suffice for the study of American-Asiatic relations to take into consideration only the present ethnological conditions, as has been done, but the ancient ethnology of that region must first be reconstructed. From this point, the further contact, if any, may be given, and as our knowledge advances, may eventually be established at a future date (I speak only hypothetically) with ancient China on the one hand, and ancient Siberia on the other,—relations which would all refer to pre-Japanese times, and move outside of the current of Japan. The early existence of bone armor is one of the examples proving that this view seems to be on the right track, and entitling us to speak of an historic antiquity in North-Pacific culture.

A pragmatic history of the development of plate armor cannot yet be written, as the subject has not been thoroughly investigated by specialists in the antiquity of western Asia, and as there are doubtless many missing links still unknown to us. Meanwhile the following indications which I have been able to trace may be welcome.

In Assyria, plate armor is unmistakably represented on monuments of King Sargon (B.C. 722–705) in connection with foot-archers, whose coats consist of six or seven parallel rows of small rectangular plates.[1] It seems that in Assyria plate mail sprang up during that period, for in the reign of Salmanassar II (B.C. 860–825) the bowmen sculptured in stone are frequently clad with long coats reaching from the neck to the ankles and girdled below the chest, the coats being covered with an irregular checkered design, but not with rows of rectangles.[2] Further, we find metal plate armor in ancient Egypt;[3] there a cuirass of thickly wadded material was covered with metal plates. It is ascribed to the reign of Ramses II, who ruled in the thirteenth century B.C.

Also the Shardana armor described by OHNEFALSCH-RICHTER[4]—consisting of bronze plates, two of which are mutually joined by means of hinges, and sewed to a foundation of linen or leather — evidently belongs to this category.

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[1] P. S. P. HANDCOCK (Mesopotamian Archæology, pp. 350–2), who speaks only of coats of mail.

[2] *Ibid.*, pp. 260, 350.

[3] An illustration of it may be seen in A. ERMAN'S Life in Ancient Egypt (p. 545, London, 1894). As a rule, the helmet and body armor did not consist there of metal, being more probably made, as many of the pictures seem to indicate, of thickly wadded material, such as is worn even now in the Sudan, and forms an excellent protection. In rare instances, however, defensive armor may have been covered with metal plates. No special investigation of this subject has as yet been made in regard to the two culture zones of Assyria and Egypt; but these indications, however brief, will suffice to show that plate armor must have been widely distributed in ancient times, and that a mere consideration of present conditions alone, as attempted by Ratzel and Hough, cannot bring about the solution of the problem of its history.

[4] *Zeitschrift für Ethnologie*, Vol. XXXI, 1899 (Verhandlungen, p. 360).

The most valuable contribution to the question is presented by a number of single bone plates of rectangular shapes, found in barrows about Popovka on the Sula in southern Russia. Five of such plates are reproduced by E. H. MINNS.[1] As these have perforations (one, two, or three) only at the top and base, we must suppose that they were sewed on to a foundation of cloth or leather; they could not have been lashed together freely without such a background, as in the Chukchi and Eskimo plate armors discussed above.[2] Those with pointed top and a single perforation, having the one side curved and the other straight, formed the ends of a plate-row. This find attests the fact that bone plate armor anciently existed in the western part of the Old World among Scythian tribes; and this case shows that in regard to Northeast-Asiatic and American bone plate armor we need not resort to the theory of explaining it as an imitation of iron in bone. If imitation it is, it may have been Scythian (or Siberian) bone armor (a single piece or several), which by trade found its way to north-eastern Asia. In the territory of the Scythians we find plate armor not only of bone and horn, but also of bronze and iron; and it seems to me that the adoption, on the part of the Scythians, of the Iranian tactics of cataphracti (p. 220) gave the impetus to the introduction among them of this type of armor. The rock-carving of the mounted lancer on the Yenisei (Fig. 35) demonstrates that plate armor, presumably of iron, had penetrated into Siberia during the iron age. I suspect the institution of cataphracti of being largely responsible for the wide dissemination of this type of armor; it was peculiarly adapted to fighting on horseback, and the Iranian mode of tactics, as we saw in Chapter III, expanded into the Roman Empire, and was adopted by the Huns, to be continued by the Turks (T'u-küe) under the T'ang dynasty. When tactics and cavalry organization spread over the boundaries of Irān, the armature of the cavaliers was necessarily bound to migrate along the same path.

The fresco paintings discovered in Turkistan furnish many valuable contributions to the history of body armor, and particularly of plate armor. A. STEIN[3] was the first to correctly recognize this type of armor in a Buddhist statue excavated by him at Dandan-Uiliq. The figure, standing over the body of a prostrate foe, is clothed with a coat of mail reaching below the knees and elaborately decorated. "The gay colors of the successive rows of small plates which form the mail, alternately red-blue and red-green, were remarkably well preserved, and not less so all the details of the ornaments which are shown along the front and lower edge of the coat and on the girdle around the waist. Even the arrangement of the rivets which join the plates of mail, and the folds of the garment protruding below the armor, are indicated with great accuracy. There can be no doubt that the artist has carefully reproduced here details of armor and dress, with which he was familiar from his own times." [1]

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[1] Scythians and Greeks, p. 188 (Cambridge, 1913).

[2] In these, perforations likewise run along the long or vertical sides of the plates.

[3] Sand-buried Ruins of Khotan, p. 272 (London, 1904); and Ancient Khotan, Vol I, p. 252, Vol. II, Plate II (Oxford, 1907).

A rich material for the study of plate mail in the art of Turkistan is offered by the fascinating work of A. Grünwedel,[2] who himself has clearly recognized and pointed out this armor type.[3] The fact that the plates are painted blue clearly proves that they were wrought from iron. The coats are tight-fitting, and open in front; the sleeves are likewise bedecked with plates, and the shoulders with pauldrons. A further example will be found in the work of A. v. Le Coq.[4]

The T'ang period (618–906) is responsible in China for a far-reaching innovation in the line of armor, which has persisted at least down to the end of the eighteenth century,— the combination of armor with the military uniform, resulting in a complete armor-costume. Up to that time, armor and garment had been distinct and separate affairs. The ancient hide harnesses were worn over the ordinary clothing or uniform, and were naturally put on only when making ready for battle; while during the march they were rolled up and carried.[1] Scale, chain, ring, and plate armor were all a great burden on the body owing to their heavy weight, and a serious obstacle to the mobility of troops. The reform is attributed to Ma Sui, who was president of the Board of War under the Emperor T'ai-tsung of the T'ang dynasty, and who died in 796.[2] He conceived the idea of combining armor with the costume (styled *k'ai i*, "armor clothing") in three grades differentiated according to length; and the soldiers thus clad were enabled to run, and to advance comfortably. The helmets he made in the form of lions.[3] This innovation is illustrated by an interesting passage in the *Ch'u hio ki*,[4] where some new names for the parts of armor are given, derived from the names of clothing. "The skirt attached to the armor is called *shang* (No. 9734, "the clothes in the lower parts of the body"); the inner side of an armor is styled *lei* (No. 6843);[5] and the coat of the armor (*kia i*, No. 5385) is termed *kao* (No. 5949)."[6] The general expression for clothing, *i-shang*, finds here application to armor: the upper portion of the armor is directly styled *i* ("upper clothing"), and the term *kao* used with reference to it plainly indicates that a robe made of some textile material was worn over the mail to cover it all round.

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[1] The comparison made by Stein (Ancient Khotan, p. 252) between this armor and that on a Gandhāra relief figured by Grünwedel (Buddhist Art of India, p. 96) is not to the point. The two suits of armor are of entirely different types, the former being plate armor; the latter, as correctly interpreted by Grünwedel, scale armor. Stein did not recognize this difference, nor did V. A. Smith (History of Fine Art in India, p. 122), who copied him on this point. Among the finds made by A. Stein (Ancient Khotan, pp. 374, 411) at Niya, there is a single piece of hard, green leather, shaped and perforated very much like the metal plate of an armor. Stein suggests that "it probably belonged to a scale armor" (he means plate armor), and thinks that this supposition is confirmed by the metal plates of an armor coming from Tibet (p. xvi). This is possible; I do not believe, however, that an entire suit of armor was ever made in Turkistan in this manner, but that only certain parts of an armor suit were of this technique. There would be no sense in producing a complete suit by means of such separate leather laminæ,—a very toilsome and cumbrous process; any plain hide coat would probably present a more enduring protection than such an affair. Indeed, this technique is known to us from Japan: thus a shoulder-guard believed to date from prior to 1100 (Bashford Dean, Catalogue of the Loan Collection of Japanese Armor, Fig. 12 B) is made from bands of laminæ of boiled leather interlaced with rawhide. Leather laminæ, of course, do not present any original state, but are a secondary development, being the outcome of an imitation of metal laminæ.

[2] Altbuddhistische Kultstätten in Chinesisch-Turkistan (Berlin, 1912).

[3] *L. c.*, p. 201, and Figs. 451, 452, 456, 460, 512, 513, 628.

[4] Chotscho, Plate 48 (Berlin, 1913).

This state of affairs is confirmed by the *Wan hua ku*,[7] where, besides cuirasses and six kinds of iron suits, are enumerated armor made from white cotton stuff (*pai pu kia*), that made of black silk taffeta (*tsao chüan kia*), and even wooden armor (*mu kia*).[8]

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[1] As expressly stated by Sun-tse (see L. Giles, Sun Tzŭ on the Art of War, p. 58, London, 1910).

[2] Giles, Biographical Dictionary, p. 569.

[3] *T'ang shu*, Ch. 155, p. 1 b.

[4] Compiled by Sü Kien in the early part of the eighth century (Bretschneider, Botanicon Sinicum, pt. 1, p. 143, No. 76).

[5] Couvreur (p. 473 c) explains this word as *mailles d'une cuirasse*.

[6] Ordinarily "a quiver," but originally a case to place any arms in; hence Couvreur (p. 304 a) *enveloppe de cuirasse, de bouclier, de lance* (see p. 176). In the above case, the costume worn over the armor is thus called, because, like a case, it envelops the armor.

[7] See above, p. 196.

[8] Wooden armor existed perhaps under the Later Han dynasty, though alluded to only in a metaphorical sense. In the Chapter *Wu hing chi* (*Hou Han shu*), ice-crusts covering trees (*mu ping*) are likened to wooden armor (*mu kiai*); and the commentary explains *kiai* as symbolizing military armor (*P'ei wên yün fu*, Ch. 69, p. 42); thus the existence of wooden armor at that time might be presupposed as being instrumental in this comparison. "Wooden armor" can be nothing but wooden slat armor, as described by W. Hough (Primitive American Armor, *l. c.*, pp. 632, 636) among the North-American Indians. Another type is presented by the wooden armor of the Thompson Indians described by James Teit (The Thompson Indians of British Columbia, *Jesup North Pacific Expedition*, Vol. II, p. 265) as consisting of four boards an inch and a half thick, two for the front and two for the back, which reached from the collar-bone to the hip-bone; these boards were laced together with buckskin, and the whole covered with thick elk-hide; while the same tribe made also

We do not know from the literary records how the armor credited to Ma Sui was constructed in detail; but it was doubtless the forerunner of the armor-costumes, as we find them duly sanctioned by the emperors of the Sung, Ming, and Manchu dynasties; those, in my opinion, go back to types established in the T'ang period. Ma Sui's invention was a coat of cotton or silk, the exterior or interior of which was covered with rows of small iron or steel plates. Indeed, plate mail is well represented on Chinese clay statuettes of the T'ang period, in accordance with what we find in the art of Turkistan. The nearest approach to Ma Sui's contrivance may be recognized in the clay figure of a soldier (five of these are in our collection) on Plate XXX. These figures coming from graves of Shen-si Province are clad with an ordinary long-sleeved coat; in front and back, over the chest, and along the lower edge, we notice a row of plates emerging.[1] Plates, accordingly, strengthen the front and back of the coat, and are covered with the same material as the latter consists of. The whole affair is tightly held together by two bands adorned with bosses.

The two clay figures on Plate XXXI represent two identical specimens of the same type of warrior, coming from Shen-si Province. The left hand, which is raised as if brandishing a weapon (spear), is unfortunately broken off in both pieces. The expression of lively motion and the quality of modelling are remarkable. In the grim faces slightly bent and turned sideways, the demoniacal power of these armored knights watching over the grave is well represented. The helmet-mask is formed by a bird's head with a strong flavor of the Indian Garuḍa; a horn or crest in the centre of the head is broken off. The well-developed eyebrows of the bird's faces terminate in spirals arranged on the foreheads; the beak is strongly curved; the interval between the eyes is filled with a pigment of indigo. The helmet covers the back of the head, nape and chin. A shawl is elegantly draped around the shoulders, and tied in a knot over the chest, the two round iron breast-plates being visible beneath it. An animal head is brought out in relief in the middle, apparently a metal clasp holding the two sheets of the armor together.[2] An apron, a sort of undivided braconnière, consisting of three horizontal rows[3] of long, rectangular iron plates is worn over

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corselets from narrow strips of wood from half an inch to an inch in thickness or of rods, going entirely around the body; the strips of wood were placed vertically, and laced together with bark strings; such vests were generally covered with one or two thicknesses of elk-skin.

[1] Compare Plate XVIII.

[2] Sheet armor is discussed in Chapter VI.

[3] It is interesting to compare it with the clay statuette found by GRÜNWEDEL, *l. c.*, Fig. 460.

the coat (Plate XXXI, Fig. 1); the plates are distinctly represented by parallel rows of lines executed in black ink and continued on the back (Fig. 42); the lines are somewhat rounded at the top, and leave no doubt of the real shape of these armor-plates. In Fig. 2 of the same Plate these lines are omitted, or may have been worn out.

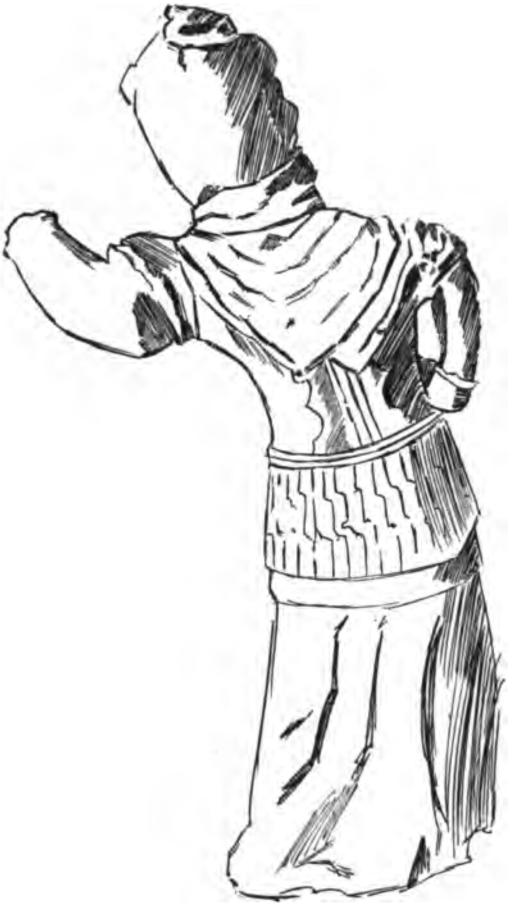

FIG. 42.
Back of Clay Statuette represented on Plate XXXI, Fig. 1.

As those two statuettes represent the typical armed warriors of Shen-si Province, so the pair on Plate XXXII illustrates the characteristic types current in Ho-nan, and is for this reason inserted here, though not vested with plate armor. Of powerful martial appearance, "armed at point exactly, cap-a-pie," these heroes valiantly lean on the hilts of their straight swords resting between their feet,— not dissimilar to a mediæval Roland. They are protected by iron sheet armor,[1] over which a jerkin is thrown, two circular spaces being cut out on the thorax, and exposing the iron plastrons or breastplates. The helmet envelops the occiput, nape, and cheeks, and is held by a broad leather mentonnière. The baggy trousers are fastened with garters over the upper parts of the thighs. Many of these figurines, as indicated by the remains of pigments, must originally have been well painted, the pigments being spread on a background formed by a thick coating of white pipe-clay.[2] In the two figures in question, judging from the traces of pigments, the helmet was colored a crimson-red, the face pink, the eyeballs black, and likewise the big mustache with turned-up tips; the breastplates were vermilion, and the garment surrounding them light green. The sleeves on the upper arms are still decorated with parallel black stripes; those on the lower arms are painted a crimson color, the hands pink. Geometric ornaments that are but partially preserved were painted in red on the portion of the coat beneath the girdle.

Plate armor is met also on contemporaneous Chinese sculpture in stone. There is in the Museum's collection a marble slab dug up in the environment of the city of Hien-yang, Shen-si Province (Plate XXXIII). It represents a mock-gate which denoted the entrance to a tomb. The two door-leaves countersunk in the slab are divided by a faint line in the centre, and kept closed by means of a bolt carved in relief. On each leaf is delicately traced the figure of a guardian completely armored with plate mail, and holding a sword. On the lintel two phenixes surrounded by rich foliage are chiselled out in flat relief.

Plate armor was officially adopted by the Sung dynasty. In 1134, the Imperial Armory had four model pieces constructed, which were founded on the principle of the plate. The first of these, an armor suit, consisted of 1825 plates (styled *ye*, "leaves," written without the classifier 'metal') polished and burnished on both sides; the épaulières (pauldrons) were protected on the inner side by 504 plates; each of these plates weighed one fifth of an ounce plus six *fên*. The second, also a coat, was formed of 332 plates, each plate of the weight of two-fifths of an ounce plus seven *fên*. The third piece, a lower garment, was composed of 679 plates of the shape of a tail-feather of a hawk, each plate weighing two-fifths of an ounce plus five *fên*. The fourth piece was a helmet consisting of 310 plates, each weighing one-fifth of an ounce plus five *fên;* the total weight of the helmet, inclusive of its appurtenances sheltering the nape and the forehead, amounted to one catty and one ounce. The leather straps wound around the head weighed five catties, twelve ounces and a trifle more than a half. Each suit had a weight of forty-nine catties and twelve ounces. The weight of an armor naturally depends upon the weight of the individual wearer; in the army, however, concern about the individual would not be feasible, and would incur heavy expense as well as waste of material. It was therefore thought advisable to reach a compromise, and to standardize the weight of the armor at from forty-five to fifty catties, with the strict understanding that in no case should it exceed fifty catties.[1]

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[1] See Chapter VI.

[2] The same process is applied to T'ang pottery vessels, as will be seen in Part II.

In regard to the Mongols, we mentioned the employment of hide and hide scale armor in their armies (pp. 190, 197). There are also accounts to the effect that plate mail was known to them. In the earliest European document regarding the Mongols, written by MATTHEW PARIS under date of 1240, giving the first description of this new people, they are described as "men dressed in ox-hides, armed with plates of iron, . . . their backs unprotected, their breasts covered with armor;" their backs remained unprotected so that they could not flee.[2] WILLIAM OF RUBRUCK, travelling from 1253 to 1255, makes us acquainted with sundry types of armor in use among the Mongols,— the haubergeon (chain mail), scale hide armor, and iron plate armor, the iron plates being introduced from Persia.[3] But the Franciscan Friar John of Pian de Carpine (or Latinized, Plano Carpini), who travelled to the Court of Kuyuk Khan (1245–47) as ambassador of Pope Innocent IV, is that mediæval writer who has left to us the clearest and most complete description of Mongol plate armor. At the same time he is the first European author to give any description of Eastern plate armor at all. In his "Libellus historicus" (Cap. XVII)[4] he describes the defensive armor of the Mongols, and states that the upper part of their helmet is of iron or steel, while the portion guarding the neck and throat is of leather. Whereas the majority wear leather armor, some have their harness completely wrought from iron, which is made in the following manner. They beat out in large numbers thin iron laminæ a finger broad and a full hand long. In each they bore eight small apertures, through which they pull three straight leather thongs. Thereupon they arrange these laminæ or plates one above another, as it were, ascending by degrees, and tie the plates to the thongs mentioned by means of other small and tender thongs drawn through the apertures. And in the upper part they fasten a single, small thong, doubled on each side, and sew it on to another, that the plates may be well and tightly connected. Thus a uniform protection is effected by these plates, and such-like armor is made for their horses as well as for their men. It is so highly polished that a man may mirror his face in it. In regard to shields, Carpini observes that they have them made of wickerware or small rods (*de viminibus vel de virgulis factum*), but that they carry them only in camp and when on guard over the emperor and the princes, and then only at night. The armament of the Mongols was not uniform; and this complex and expensive structure of plate armor was probably within the reach of but few. Their ordinary armor was a cuirass of boiled-leather scales. According to Carpini, the leather was that obtained from an ox or some other animal; and the scales were a hand broad.[1] Three or four of these were held together by means of pitch, and connected with one another by means of cords. In double or triple rows they were laid around the trunk. The complete set of armature consisted of four parts,—the front piece, reaching from the neck down to the lower part of the thighs, and well adapted to the form of the body; the back protector, and an apron encompassing the back and abdomen; and the brassards and cuishes. The back of the upper arm was guarded by two iron plates hinged together.

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[1] See *Sung shi*, Ch. 197, p. 6.

[2] W. W. ROCKHILL, The Journey of William of Rubruck, p. xv (London, 1900).

[3] *Ibid.*, p. 261. He mentions also iron caps from Persia.

[4] In the new edition of G. PULLÉ, pp. 86–88 (*Studi italiani di filologia indo-iranica*, Vol. IX, Firenze, 1913). C. R. BEAZLEY, The Texts and Versions of John de Plano Carpini, pp. 89, 124 (London, 1903, *Hakluyt Society*).

The plate idea has remained the basic principle of the officially recognized body armor down to the end of the eighteenth century. The changes were those of style and ornamentation only, while no fundamental innovations were added in the Ming and Manchu periods. The Statutes of the Ming Dynasty (*Ta Ming hui tien*) contain the following regulations relative to plate armor: "In 1374 it was ordered that instead of the threads, by means of which the armor-plates were held together, leather thongs should be used. In 1376 the General Staff was ordered to make war-suits of cotton (*mien hua chan i*), and to apply to them four colors, — red, purple, dark blue, and yellow; for Kiang-si and other places, to make war-coats with different colors on the exterior and interior, and to cause the officers and petty officers to change their uniforms accordingly. In 1383 orders were given for harness, each set to be made as follows: for the colletin (neck-guard) thirty plates, for the body armor two hundred and nine plates, for the plastron (breastplate) seventeen plates, for the pauldron (épaulière)[2] twenty plates.

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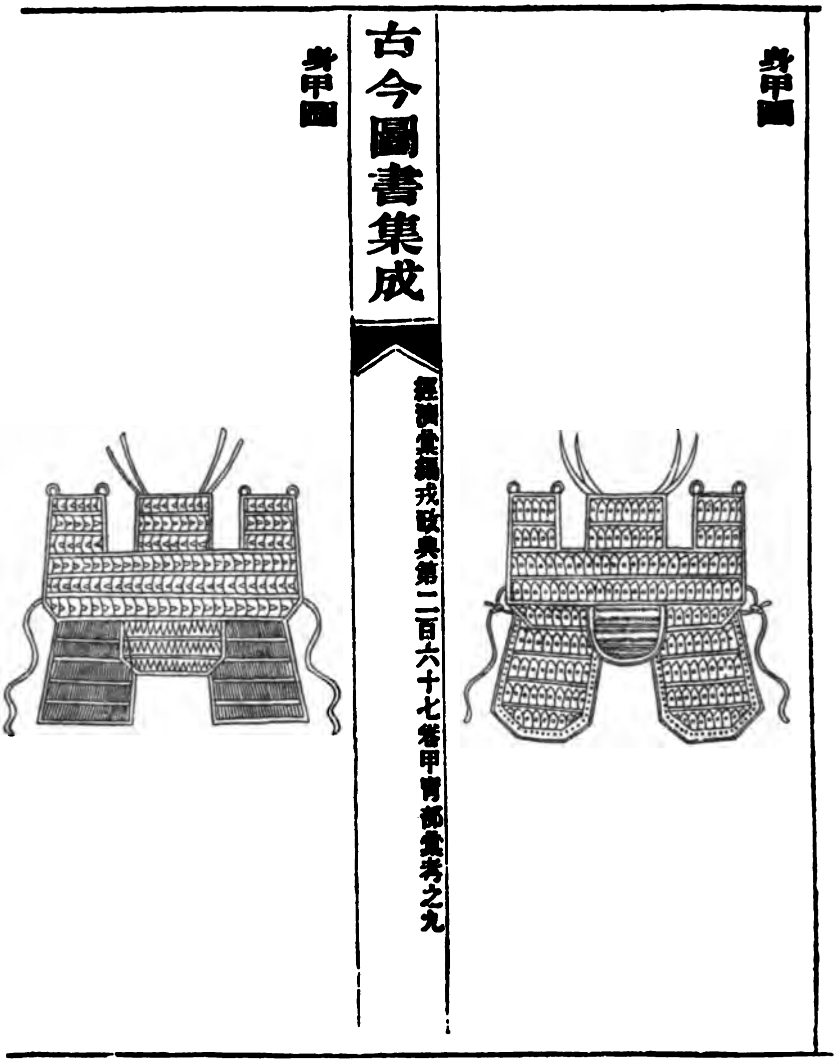
[1] PULLÉ's complete text is followed here; this portion is lacking in the former editions of Carpini.

[2] In Chinese, "arm-pit plates" (*chi wo ye*).



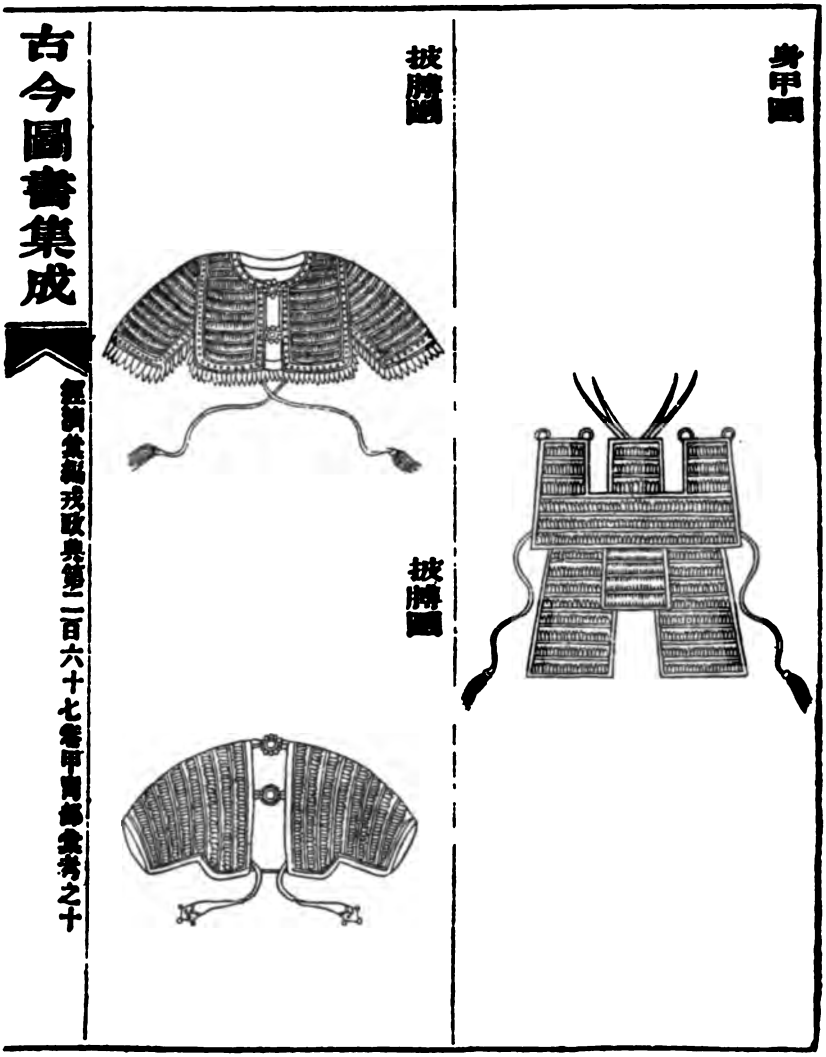
身甲圖

古今圖書集成

經濟彙編戎政典第二百六十七卷甲冑部彙考之九

身甲圖

Fig. 43.
Illustrations showing the Conventional Chinese Style of Drawing Plate Mail (from *T'u shu tsi ch'êng*).



身甲圖

披膊圖

披膊圖

古今圖書集成

經濟彙編戎政典第二百六十七卷甲冑部彙考之十

FIG. 44.
Illustrations showing the Conventional Chinese Style of Drawing Plate Mail (from *T'u shu tsi ch'êng*).

All these pieces are soaked with lime, and united by means of soft, tanned leather thongs passing through the perforations of the plates. Along the maritime coast of Chê-kiang and in Kuang-tung, the guards stationed there have to utilize black-lacquered iron plates perforated and connected by cotton strings; for the rest, however, their armor is made in the style of the 'brilliant armor' (*ming kia*).[1]

"In 1435 (tenth year of the period Sūan-tê) the ordinance was issued that each coat had to be fixed at a length of four feet and six inches, with a supply of two catties of cotton and velvet; for the making of the trousers, half a catty of cotton and velvet should be used; the wadded boots should be from nine inches and a half up to one foot, or one foot and two inches long. Now, the regulation was provided to make wide coats and trousers, and to employ for these fine, closely woven, broad, and white cotton stuff dyed blue, red, or green; the sleeves should be wide and long; and the materials employed, like cotton and velvet, should be of solid quality. The wadded boots should be fine, thick, and strong. In the finished garment a written entry was to be made by the government officers who inspect the troops and examine their equipments; they shall enter the family name and surname of the tailor, the cost-price, the measurements in feet and inches, the weight, the number of strips of cloth used in the skirts, with seal attached. At fixed terms, every year before the seventh month, the uniforms were to be furnished.

"In the year 1496 (ninth year of the period Hung-chi under the Emperor Hiao-tsung) it was ordered that for the covers of the armor[2] thick and dark blue and white cotton stuff should be employed, that for the 'armor with nails' (*ting kia*) small studs with lacquered heads should be used. It was further settled that, for each set of a blue cotton stuff iron armor, iron to the quantity of forty catties and eight ounces should be required, and that each set of the finished armor should weigh twenty-four to twenty-five catties. In 1503 order was given that the guards stationed in southern China should exchange their iron armor for that made of water-buffalo skin sewed together by means of cotton ropes."

Figs. 43 and 44 are here inserted to illustrate the conventional Chinese style of representing plate mail.[3]

The Manchu dynasty adopted the military institutions of the Ming in their entire range, and in particular the defensive armor, without making any new additions in the line. Plate XXXIV illustrates a horseman's suit of armor, as it was in vogue during the K'ien-lung period (1736–1795). It is complete with leggings and helmet. The lower garment is covered by four parallel rows of very thin, light and elastic steel laminæ of rectangular shape, 9 cm long and 1 cm wide, rounded at the upper end, perforated at both apex and base, and sewed on to a foundation of cloth, the lower ends being hidden in a fold, where they are riveted by means of studs with broad, gold-plated heads. They are not mutually joined, but one overlaps another to a slight degree. In the upper garment the steel plates are invisible, being inserted as an interlining (between the lining and the silk on the exterior), and fastened by means of rivets, so that their gilt heads appearing on the surface indicate the hiding-places of the plates.[1] Dragons, all together six, rising from the sea and standing erect, are embroidered with gold threads on the front and back of the coat, on the two separate shoulder-pieces, and on the two side-pieces underneath the arms. The casque, composed of two steel sheets and surmounted by a black velvet plume, has chased dragons in front, and is provided with silk protectors enveloping occiput, neck, ears, and chin.

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[1] A technical term frequently employed in the Annals; it presumably refers to highly varnished and polished plates of iron or steel.

[2] In Chinese, "the face of the armor" (*kia mien*).

[3] Compare note 4 on p. 243.

The uniform of an artillery-man (Plate XXXV) consists of a coat, lower garment, and pair of leggings of wadded black satin lined with light-blue silk, and studded with gold-plated, riveted bosses. These bosses, of a merely decorative character, are the survivals of the iron or steel plates which, as in the preceding harness, are wrapped up in the interior of the garment or are fastened to the lining. The plates are retained in this specimen only for the protection of the shoulders, but have a decorative rather than a positive value. They are arranged in rows of three, two rows being in front and two at the back on each shoulder, and connected by a broad, quadrangular plate resting on the shoulder. Each lamina is of steel and gold-plated, and chased with a four-clawed dragon soaring in clouds. From the lower ends of the plate rows project two gold-plated arms, likewise chased with figures of dragons and encircling a round metal plaque (of white copper or tootnague, with brass rim). A plaque of the same material and size is fastened to the back. Such circular plaques are known as *hu sin king* (No. 2170), literally "mirror guarding the heart;" that is, a protective amulet. The helmet is identical with the one previously mentioned, and heavily lined with quilted material.

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[1] It is singular that the students of plate armor have never turned their attention to China, although it was very clearly described as early as by GERBILLON (in DU HALDE, Description of the Empire of China, Vol. II, p. 340, London, 1741): "All the soldiers who were in the camp, headed by their officers, repaired to the place appointed, armed with their casques and cuirasses. The Emperor put on likewise his cuirass and helmet, being accompanied with his eldest and third sons; but this latter was not armed, being too young to bear the weight of a Tartarian cuirass. This cuirass consists of two pieces; one is a sort of under petticoat which is girt about the body, and reaches below the knee when they are standing, but covers all their limbs when they are on horseback: the other piece is like the coats of armor of the ancients, but the sleeves are longer, reaching to the wrist. The outside of both these pieces is of satin, for the most part purple, embroidered with gold, silver, and silk of various colors. Next to this satin, lined with some pieces of taffety, are hammered plates of iron or steel, finely burnished, which are placed like scales on the body of a fish, whence they probably took the notion. Each plate, which is about an inch and half long, and a little more than an inch in breadth, is fastened to the satin by two small nails, the heads, being round and well polished, appearing without. Some few put another piece of taffety within-side, which covers the iron plates. These cuirasses have this conveniency that they do not deprive the body of the liberty of turning and moving easily; but then they are exceeding heavy."

The archer's suit of armor (Plates XXXVI, XXXVII) is made of black silk, the interior being covered with broad steel plates, each secured by means of two rivets only, so that the plates are loose and movable. Their disposition on the shoulders is at variance with that in the preceding specimen. There is but one row of three brass plates in front of each shoulder, extending in length as much as the two rows in the previous armor. There are three narrow plates arranged side by side on the surface of the shoulders, and three on the back much shorter than those in front. The three rows covering either shoulder are interlaced and riveted together. Each of these shoulder-plates is decorated with two rampant dragons playing with a flamed ball. The coat is embroidered with six dragons all together.

In 1901 I saw a very interesting and ancient suit of plate mail in the Mahākāla Temple, which is situated within the walls of the Imperial City of Peking. The suit is of yellow silk, to which iron plates are attached both outside and inside, — those on the exterior being very narrow slips, those on the interior being four times broader and occupying the interval left by the outside plates; so that by this alternating process a complete plating is insured.

On Plates XXXVIII–XL is represented what may be styled a parade or ceremonial armor. It is the uniform belonging to a guard-officer of the first rank, detailed on duty in the Imperial Palace.[1] These military officers were divided into seven ranks, each distinguished by a special coat and helmet, and an equipment with appropriate insignia. Their outfits are minutely described in the State Handbook of the Manchu Dynasty. The cut, the style, and the main characteristics of body armor are well preserved in this costume, which is magnificently embroidered with heavy gold thread, and studded with gilt bosses. Dragons', tigers', and lions' heads are the prevailing motives of ornamentation. The disposition of the shoulder-plates is identical with that in the suit of the artillery-man, except that the dragons are here embossed, and the clouds are treated in open-work, all metal pieces being heavily gilded. Five similar plates are suspended from the ends of the shoulder-pieces.

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[1] This is ascertained from the descriptions and illustrations of the official costumes given in *Huang ch'ao li k'i t'u shi* and *Ta Ts'ing hui tien t'u.*

The steel helmet (Plate XXXIX) is a gaudy and elaborate affair of admirable workmanship. It is surmounted by a high crest terminating in a pair of eagle-feathers painted with dragons in gold, and is adorned with twelve black sable-tails,[1] seven of which are preserved. Dragons are lavished on it, being chased in the plated brass mountings, or cut out of the same material in full figure, or represented in inlaid feather-work.[2]

The bow-case and quiver figured on Plate XL belong to the accoutrements of the same official. They are of leather, dressed with red velvet; the upper corners and lower portion of the bow-case are finished with black leather. The metal fittings, of gilt bronze, fastened to the centre and corners of both objects, are of very elegant forms and delicate workmanship. The quiver, in addition to these ornaments, is decorated with three symbols meaning "longevity" (*shou*). The arrows are stuck into the folds in the interior formed by layers of brown felt.

Reference has been made above (p. 272) to the early mining of iron in Korea, and the barter carried on in this metal from there to the neighboring tribes. Metal armor (*k'ai kia*) seems to have prevailed in the kingdom of Kokurye (*Kao-kü-li*) at an early date.[3] The Annals of the Sui Dynasty[4] state in regard to the kingdom of Sinra in Korea that its defensive and offensive armor is identical with that of China, which would mean that Sinra had derived its armor from China. The Books of the T'ang Dynasty mention a kind of armor, seemingly peculiar to the state of Pek-tsi in Korea, under the name "armor of bright lustre" (*kuang ming k'ai*), which must have been iron armor. Such a suit was presented in 622 to the Emperor of China, and in 637 iron armor (*t'ie kia*), together with carved axes, was sent as tribute to the Emperor T'ai-tsung.[5] Metal armor is alluded to likewise in the Annals of Korea.[6] When the Japanese plundered the royal palace of Kokurye, in 562, they obtained among other treasures two suits of armor.[1] We have no exact information as to what these ancient suits of armor were like, and can base our conclusions only on such specimens as we find in the country at present. Among these are some of considerable age; that is, ranging within the time of the last two centuries or so. We have two main types of harness from Korea,—padded armor[2] and plate mail.

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[1] This is the required number according to the official statement.

[2] From the blue plumes of the kingfisher, *Halcyon smyrnensis* (in Chinese, *fei-ts'ui*).

[3] *Liang shu*, Ch. 54, p. 9 b; *Nan shi*, Ch. 79, p. 1 b.

[4] *Sui shu*, Ch. 81, p. 4 (also *Pei shi*, Ch. 94, p. 7).

[5] *T'ang shu*, Ch. 220, pp. 4, 7.

[6] See, for instance, *Ta tung ki nien* (published at Shanghai, 1903), Ch. 1, p. 69 b. The Koreans possess a considerable literature on military art (M. COURANT, Bibliographie coréenne, Vol. III, pp. 63–89).

A very interesting specimen of the latter type is in the Museum collection (Plates XLI, XLII). It is a rough-looking coat of strong twill, lined with blue cotton, and covered with hemp cloth of loose texture imprinted all over with charms by means of wooden blocks.[3] The designs are effaced to such a degree that the details can no longer be recognized: birds' heads, floral designs, trees, arabesques, are conspicuous; Sanskrit letters, which occur in other specimens, are absent. The buttons in front are of bone; the sides are open, and provided with rows of buttons. Both front and back are strengthened by seven parallel rows of rectangular steel plates (averaging 10.2 × 7.5 cm), very flexible, each coated on both faces with a black varnish. The plates are not mutually connected, but merely imbricated,—a feature not yet observed in Chinese plate mail. Each plate is clinched to the cloth foundation by means of two rivets with flat heads. They are driven through, and appear on the exterior as big iron nail-heads. A number of plates have additional perforations that are not utilized, but which show that the plates could have been tightly sewed on to the background had not the wearer of this armor preferred to have them loose and movable. The shoulders are covered on the interior by two rows of plates, and are reinforced on the outside by iron bars, one for either shoulder, each bar consisting of two parts hinged together, so that easy motion is secured. The casque (Plate XLII) consists of two sheets of iron riveted together, with a projecting visor and frontal covering the forehead. The couvre-nuque and the ear-protectors attached to the casque are made from the same hemp cloth as the harness; they are likewise printed with designs, and stuffed with iron plates, which are kept in place by means of the clinches appearing on the surface. The top of the helmet is surmounted by an iron trident and a tuft of red-dyed horse-hair. There is no doubt that this Korean armor represents a very primitive type of plate mail, and conveys to us an excellent idea of what the ancient Chinese plate mail may have been like.[1]

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[1] ASTON, Nihongi, Vol. II, p. 86.

[2] A Korean armor consisting of many thicknesses of coarse cotton cloth is figured by W. HOUGH (The Corean Collections in the U. S. National Museum, *Report U. S. Nat. Mus.*, 1891, Plate XXVIII, and Primitive American Armor, *l. c.*, p. 645); the surface of portions of the coat is printed with prayer formulas (*dhāraṇī*) in Sanskrit, and such are inscribed also on the helmet. This practice seems to be derived from China: the helmets used by the imperial house during the Manchu dynasty were chased with Sanskrit characters (see *Huang ch'ao li k'i t'u shi*, Ch. 13, or *Ta Ts'ing hui tien t'u*, Ch. 61). A modern Korean helmet is illustrated by E. ZIMMERMANN (Koreanische Kunst, Hamburg, no date, Plate VI). It is a leather helmet of conical shape, surmounted by a bunch of horse-hair and a metal ball in open-work, and adorned with dragons and a hydra about to attack, wrought in gilt metal; fur-lined ear-warmers covered with metal studs are attached to it, the whole style being that of the Manchu dynasty. The costume on Plate VII, explained as the official robe of a minister, is in fact a pseudo-armor, as shown by the rows of metal bosses and the two appliqué dragons playing with balls; it is similar to the one on our Plate XLIII. Generals' and soldiers' helmets are figured and briefly described by F. H. JENINGS (Korean Headdresses in the National Museum, *Smithsonian Miscellaneous Collections*, Vol. 45, 1904, pp. 161–163). Good specimens of these are also in the Field Museum.

[3] Much in the style of Tibetan cloth prints which are attached to flag-poles set up on the roofs of houses in order to bring luck to the inmates.

On Plate XLIII is shown the Korean court costume of a high official, which is a pseudo-armor in imitation of Chinese style. The cloak-like robe consists of red cloth trimmed with otter-fur, and lined with light-blue Chinese silk. It is strewn with regular rows of brass bosses representing purely decorative survivals or reminiscences of plate armor. Three globular buttons close the garment in front; the two lower ones are hidden under a broad sash of figured blue silk. Around the neck are laid twelve maple-leaves cut out of brass and riveted to the cloth (in the illustration hidden by the ear-protectors of the helmet). The epaulets are adorned with full figures of gilt, embossed dragons hunting for the flamed jewel; they are worked in sections, which are cleverly connected by hinges, so that the shoulders are not handicapped in any motion. The helmet is an elaborate affair, composed of strong, compressed, glazed leather, lined with soft leather. The surface is divided by means of four metal bars into four compartments, two of which are each adorned with a dragon, the two others each with a phenix on the wing, — all of gilt bronze. On the sides, silver phenixes filled with dark-blue enamel[2] are added. The most interesting point concerning our subject is the fact that the ear-muffs and nape-guard, likewise of red cloth trimmed with otter-fur, have thin copper plates concealed between the outside material and the lining. They are kept in place by copper nails with gilt heads. A quilted cap of blue silk is worn next to the skull, under this helmet. Below, on the same Plate, is illustrated the black-varnished wooden chest in which the suit is stored, with a special conical compartment for the casque. This arrangement is also in imitation of a Chinese practice. Japanese plate armor has so frequently been described[1] that it is not necessary to dwell on this subject. What is important for the purpose of our investigation is the fact that it does not arise in Japan earlier than the first part of the ninth century;[2] that is, in the T'ang period, when it was perfectly known in China. It is therefore certain that the idea has penetrated into Japan from China and Korea, whatever subsequent developments, changes, and improvements plate mail may have undergone in Japan.

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[1] W. E. GRIFFIS (Corea, the Hermit Kingdom, p. 101) figures what he calls "a Korean knight of the sixteenth century." I have no judgment on the authenticity and alleged dating of this illustration, but in itself it is interesting in that the laminæ forming the plastron and reinforcing the sleeves and brassards are arranged in horizontal (not, as usual, vertical) position. "Many of their suits of armor," GRIFFIS says, "were handsomely inlaid, made of iron and leather, but less flexible and more vulnerable than those of the Japanese, which were of interlaced silk and steel on a background of tough buckskin, with sleeves of chain mail. The foot-soldiers on either side were incased in a combination of iron chain and plate armor."

[2] A process still extensively applied in China to silver jewelry.

Armor composed of horizontal rows of small iron plates, presumably of Chinese origin, seems to occur occasionally in Tibet. A specimen recently presented by the Dalai Lama to the King of England is now preserved in the British Museum.[3]

Looking backward at the remarkably wide distribution of plate armor, we cannot fail to recognize in this fact a certain degree of historical coherence. This coherence, without any doubt, exists in the T'ang period between Turkistan and China on the one hand, and between China, Korea, and Japan on the other hand. But the T'ang epoch denotes only the culminating point in this development, — that period in which we observe plate mail wrought to its greatest perfection. Metal plate mail is a complex affair of difficult and refined technique, a downright product of higher civilization, which is witnessed by the fact that it is conspicuously absent among all primitive cultures of Asia, Africa, and ancient Europe. Certainly it did not come into existence all at once as a finished product of industry. It ran through many experimental stages, and took time to develop and to mature. The elegant specimens of the T'ang, granting the muscles free motion and aiming at æsthetic qualities, were preceded by those of coarser and cruder workmanship; as we see, for instance, in the Korean specimen on Plates XLI and XLII. There is a great deal of probability in the supposition that such existed, both in China and among the Iranian and Turkish tribes of

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[1] First by PH. H. v. SIEBOLD, Nippon, Vol. I, p. 333.

[2] J. CONDER, The History of Japanese Costume (*Transactions Asiatic Society of Japan*, Vol. IX, 1881, p. 256). According to this author, the employment of plates and scales of iron in armor was finally established as late as the epoch Tenshō (1573–1592). See chiefly BASHFORD DEAN, Catalogue of the Loan Collection of Japanese Armor.

[3] It is figured on Plate III of the Ethnographical Guide published by the British Museum. See also A. STEIN, Ancient Khotan, Vol. I, p. XVI. Armor of small steel plates riveted on red velvet appears also in Europe (see, for instance, BASHFORD DEAN, Catalogue of European Arms, p. 48), but this subject is not within the scope of the present investigation.

Central Asia, ages before the T'ang, presumably as early as the era of the Han (p. 214). Iranians surely were the mediators between the west and the east in this matter, in the same manner as they acted in the transmission of chain mail, caparisons for horses,[1] and the great principles of cavalry tactics. Up to this point the territory is fairly well reconnoitred. But thus far we are entirely ignorant of when and how plate mail may have arisen in Irān, nor do we positively know whether it existed there at all; if it did, the possible connection with the plate mail of ancient Egypt and Assyria remains a subject for investigation. Altogether the impression remains that plate armor, the last offshoots of which we encounter in the farthest north-east corner of Asia and the farthest north-west of America, took its origin from western Asia. This field is entirely beyond my competency; and it is the sole object of these notes to point out the existence of the problem, and to leave its final solution to the ambition of others.

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[1] See Chapter VII.

VI. DEFENSIVE ARMOR OF THE T'ANG PERIOD

In the preceding notes we had occasion to refer repeatedly to defensive armor of the T'ang period (618–906). Mention has been made of the fact that cuirasses of rhinoceros-hide were then still in existence (p. 189), and also that those of buffalo-hide then came into vogue (p. 162). Plate mail reached its climax at that time (p. 277), and chain mail was introduced from Iranian regions (p. 246). The types of armor utilized under the T'ang must have been of a large variety. The Statutes of the T'ang Dynasty, drawn up by the Emperor Yüan-tsung (713–755),[1] enumerate thirteen classes of armor manufactured by the Imperial Armory (*wu k'u*): six of these were of iron, and of the types of plate, scale, and chain armor; others were of white stuffs, black silk, hide, and even of wood (p. 276). How the military uniform was then combined with armor has also been set forth (p. 275). Besides the means of protection officially recognized in the army, there were other plain and cheap contrivances for the use of the people, such as are still common in the country. Thus we hear in the Annals of the T'ang Dynasty in regard to a certain Ch'êng K'ien that he made defensive armor from layers of felt.[2] The most curious armor of which we read in that period was a kind made from sheets of paper laid in folds, which could not be pierced by the strongest arrows; this invention is credited to Shang Sui-ting.

Under the Sung dynasty, paper armor was officially recognized, for we hear that in the year 1040 the troops stationed in Kiang-nan and Huai-nan (in An-hui Province) were ordered to fabricate thirty thousand suits of paper armor, to be distributed among the garrisons of Shen-si Province. The localities mentioned are celebrated for their paper manufacture, and were accordingly obliged to contribute to a demand which could not be filled in Shen-si. The *Wu pei chi* (Ch. 105, p. 17) of 1621 has preserved for us an illustration of such paper armor (Fig. 45), arranged in triangular scales slightly rounded at the base. These suits were especially favored under the Ming in southern China by the soldiers fighting the Japanese, who then invaded the Chinese coasts.[3] The favorite brand of paper for this purpose in recent times was the famed Korean paper highly prized in China and Japan for its toughness and durability, and forming part of the annual tribute sent from Korea to Peking. In the treaty of 1637, concluded after the Manchu invasion, the figure was stipulated at five thousand rolls of large and small paper.[1] A good deal of Korean paper was utilized by the tailors of the Chinese metropolis as lining for the coats of officials and gentlemen. It served also for the covering of window-frames. A sewed wad of from ten to fifteen thicknesses of it made a protective armor for the troops. It is said to have resisted a musket-ball, but not a rifle-bullet.[2]

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[1] See above, p. 189.

[2] *P'ei wên yün fu*, Ch. 40, p. 86. In 1286, according to *Yüan shi*, the country of Ma-fa sent a tribute of saddles, bridles, and felt armor.

[3] The same work illustrates also armor of plaited rattan; but it is not known at what time this type of armor sprang up in China.

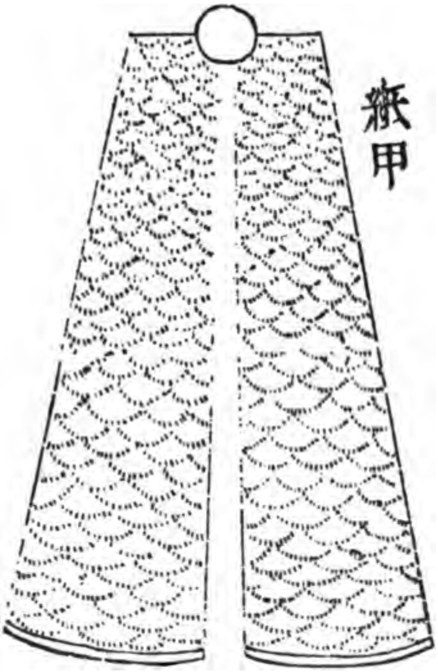

FIG. 45.
Paper Armor (from *Wu pei chi*).

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[1] W. W. ROCKHILL, China's Intercourse with Korea, p. 25 (London, 1905). A notice on Korean paper is contained in the *Wei lio* (Ch. 12, p. 1 b).

[2] W. E. GRIFFIS, Corea, the Hermit Nation, p. 153 (New York, 1904). Paper and cotton armor still exist in southern China. Consul BEDLOE (quoted above, p. 180) offers the following remarks on this subject: "Parallel to this alternating of leather and wool in the north was that of paper and cotton cloth in the south of China. It seems ridiculous to call such combinations armor, and yet they make an armor superior in many instances to steel. Thirty thicknesses of alternate calico and paper will resist a pistol bullet or one from a rifle at a distance of a hundred yards. A spearman who thrusts his weapon into a man clad in this kind of garment

The most interesting source for the study of T'ang defensive armor is naturally offered by the clay figures and figurines; and these reveal to us a new style of armor, that of sheet armor, which is thoroughly characteristic, not of the life, but of the art, of this period.

The type of clay image which comes here into question is of the greatest interest, as it originated in the Çivaitic worship of India, and became widely diffused over Tibet, Turkistan, China, and Japan. We may in general classify the manifold variations of this type among the so-called Dharmapāla ("Protectors of Religion"), guardian deities adopted by Buddhism, and more specifically designate it as Yama, the God of Death, who still plays such a prominent rôle in Tibetan Lamaism. J. EDKINS[1] holds that he may be pointed to as the most remarkable example of the influence of Hindu mythology on the popular mind of China.

Among the clay figures of the T'ang period we find two fundamental types of this Hindu god,— a zoömorphic and an anthropomorphic form. The zoömorphic form is doubtless the older one, and is closely associated with the Lamaist representation of Yama as Dharmarāja ("King of the Law"), figured with the head of a bull, and dancing on the back of this animal.[2] Old ZIEGENBALG, who wrote in 1713 at Tranquebar on the coast of Coromandel, gives the following description of his image as found in southern India: "Yama is represented as being quite black, with a horrible face, and a crown on his head, and altogether surrounded by fire. In his mouth he has a lion's teeth, and in his four hands he holds respectively a club, ropes, a trident, and a wine-jug, from which he gives wine to the dying to mitigate the bitterness of death. On the whole he is adorned like the king, and rides on a black buffalo. The poets have written many stories about him, which these heathens receive with undoubted credence."[3]

On Plate XLIV we see him modelled in clay, with most powerful

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can neither wound his enemy nor extract his weapon, and if his enemy is an archer or is armed with a long sword or javelin, he is likely to lose his life for his mischance. The suit of a famous Yün-nan bandit consisted of sixty thicknesses of cotton cloth and paper, and made him practically invulnerable. These suits are comparatively light, are very durable, and of course, extremely cheap." Heavy quilted cotton armors are still occasionally worn by Chinese in this country under their garments, when the members of secret societies are on the war-path. The writer was once shown a wonderful specimen in the Police Department of New York, which weighed so heavily upon the unfortunate Chinaman that he was unable to run, and was easily captured after a shooting-affair.

[1] Chinese Buddhism, p. 219 (London, 1893).

[2] PANDER and GRÜNWEDEL, Pantheon des Tschangtscha Hutuktu, p. 62; GRÜNWEDEL, Mythologie des Buddhismus, pp. 62, 168, 174.

[3] B. ZIEGENBALG, Genealogy of the South-Indian Gods (translated into English by G. J. METZGER), p. 192 (Madras, 1869).

expression and lively motion, standing on the body of a sow.[1] The animal is represented in the agony of death, with wide-open muzzle and with its facial muscles distorted, stretching forth its four feet. The terrific god has the head of a bull, exactly as in the corresponding Tibetan images,—with two curved horns, bushy eyebrows, and protruding eyeballs painted black; his mouth is wide agape, and shows the esophagus. Palate and face are coated with a red pigment. Hands and feet are provided with sharp eagle-claws. The head is surrounded by flames.[2] A projecting crest is attached to the spine, and there is a tail at the end of it.

Another representation (Plate XLV), likewise with horned bull-head, shows him in the same posture, standing over the back of a reclining bull, a snake winding around his left arm. In another clay figure (Plate XLVI) he is clad with a leopard-skin, and standing in the same attitude as the two preceding ones, but without a bull; the bearded face, though of human traits, bears a grim, demoniacal expression, and is painted red, beard and mustache being in black outlines. The erect ears are animal-like, as are the hands and feet; the head is surmounted by a long, slightly twisted horn, somewhat similar to that on the clay figures of sphinxes.

Between the animal and the human types, there is an intermediary form with some features borrowed from both. In Fig. 1 of Plate XLVII, his head is still modelled in the style of the bull-faced Yama, with horns and flames, but he is equipped with an armor in the same manner as the human forms; and the plume surmounting his head-dress is identical with the one in the figures of knights (Fig. 2 of the same Plate). The statuette on Plate XLVIII, belonging to the same intermediary type, displays all these features brought out still more clearly,—the two-horned bull-like head with a certain assimilation to human traits, the high plume and pommels of the elaborate head-dress, animal-heads protruding from the sleeves, breastplates, an apron, and a skirt consisting of two flaps; thus he is standing over the figure of a demon.[3] A demon of exactly the same type is modelled in the glazed statuette on Plate XLIX. The god, however, is here represented as a purely human form, a knight clothed with heavy armor, pressing his right hand on his hip, and raising his left. The figure, except the head, is coated with soft lead glazes in four colors,— green, blue, brown, and yellowish white; the demon is glazed yellowish white with brown hair. The plastron of the knight's armor is blue, the circular portions are white, the knobs in the centre are blue.[1]

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[1] Why in this particular case a sow, and not as usual a cow, is represented, I do not know. The interpretation itself is indubitable, the animal being modelled in a most naturalistic style and thoroughly characterized by the anatomy of the head and the crest on the skull and spine.

[2] The tips of two of them are broken off.

[3] Compare in Indian art Kubera standing on a Yaksha (GRÜNWEDEL, Buddhist Art in India, p. 40; and Mythologie des Buddhismus, p. 15).

Besides the god in the garb of a knight trampling down a demon, we meet again a similar type of knight standing on the back of a reclining bull (Plate L).[2] The positions of feet and hands are quite stereotyped. The right foot is set on the head of the bull, the left on its croup; the left arm is akimbo, and the right hand is raised as if throwing a weapon (Plates LI and LIII, Fig. 1). Or, the left foot rests on the bull's head, the right on its croup, while the left arm is akimbo, and the right hand raised for attack (Plates LIII, Fig. 2, and LIV). It will be noticed how the conventionalization of this type gradually advances. Somewhat more artistic features adhere to the statuette on Plate LII, which, with the exception of the head, is glazed in three colors,— green, brown, and yellowish white; the bull is lost, and may be supplemented from the preceding figure in Plate LI.[3] The bull, as previously pointed out, alternates with the demon (Plate LIII, Fig. 2). In Plate LIV, Fig. 2, a human body is plainly fashioned; so that in this case we have the same motive as in the Lamaist images, in which a human corpse serves as basis for certain Tantrik deities.

The flat miniature figure on Plate LV is very curious, in that it is cast from lead; it shows Yama in the same pose as the preceding ones, and standing on a bull. Finally we see the ultimate stage of development in clay figures without the mythological attributes of the bull or demon; these are purely armored knights or guardians. But the derivation of this type is unmistakable. The demoniacal expression in the face of the tall figure (Plate LVI)— the mouth is agape, as if he were represented shouting — reveals his affinity with the group of the God of Death. His style of hair-dressing is the same as that in the figure on Plate L, and he is armored in the same manner as the preceding images. Such a demon-like creature is disclosed also by the warrior on Plate LVII, with very elaborate body armor consisting of large plastron and dossière of metal, connected by leather straps running over the shoulders. It is plainly visible how the two breastplates join together in the middle. He wears a high collar and turned-up sleeves, animal-heads being brought out on the upper arms; the waist is narrow and tied by leather straps, and an apron of plate mail is hidden under the garment.

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[1] The method of glazing in the T'ang figures is very interesting: the idea underlying the application of glazes, if more than one glaze is enlisted, seems to centre upon the tendency of reproducing the colors of costume or armor. In the majority of cases, probably in all human figures, it is only the costume which receives the colored glaze, while head and hands remain uncoated. In the figurines of women it is sometimes merely the central portion which is glazed, the dresses usually being of green and brownish-yellow tinges, while the remaining portion is covered with a white plaster. In the case of monochromes, the glazing as a rule extends to the whole figure.

[2] A curious analogy to this type is offered in European mediæval art by the brasses of English lords in full armor standing on the back of a lion or another animal, and by the monument of Count Otto IV of Henneberg, and other German statues (for illustrations see, for example, BASHFORD DEAN, Catalogue of European Arms and Armor, Figs. 17–22; or Encyclopædia Britannica, Vol. I, p. 587).

[3] A type similar to this one is figured on Plate XIV of the Catalogue of Early Chinese Pottery, published by the Burlington Fine Arts Club (London, 1911), except that in this figure both feet are straight on the same plane. The modelling of the head, the position of the left arm, the armor, and the style and colors of the glazing, are identical in both figures. The pose of the right arm, however, must have been different in our figure, in accordance with the drawn-up right foot; it doubtless has to be supplemented correspondingly with the left arm in the figure on Plate XLIX; that is, the arm was raised, and the hand either formed into a clenched fist, or the palm stretched outward. Also in the specimen referred to, which is in the possession of Mr. G. Eumorfopoulos of London, the face and hands are unglazed, while the remainder is glazed in cream, orange-yellow, and green colors.

Finally we come to clay figures which are plainly knights or guardians armored *cap-à-pié*, without any mythological reminiscence (Plates LVIII–LX).

In Japan, types exist which are related to the Chinese clay figures already described. These are of highly artistic qualities, and show us that in the T'ang period a Buddhist school must have flourished, the tradition of which embraced the whole of eastern Asia. Two examples are here selected. The one is a clay figure, originally colored, in the Tōdai temple in Nara, founded in the middle of the eighth century (Fig. 46).[1] This remarkable statue is justly dated by the Japanese in the eighth century (T'ang period). Head-dress and armor, as well as pose of hands and feet, closely agree with those of the Chinese types; here we observe that the raised hand was indeed grasping a weapon. The Japanese name this figure Dhṛitarāshṭra, one of the four Mahārāja or Lokapāla of Hindu mythology guarding the world-mountain Sumeru. Another very similar statue (Fig. 47),[2] likewise and justly attributed to the eighth century, is named Virūpāksha, the third of the four guardians of the world. Both are posed on the bodies of demons.[3] The four Lokapāla are conceived as kings and heroes, and hence represented as

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[1] The sketch is reproduced from the *Kokka*, No. 170, 1904.

[2] From the *Kokka*, No. 42. In the same manner Vajrapāṇi is represented (*Kokka*, No. 28, Plate V).

[3] The Japanese identifications are doubtless based on correct traditions, but I am not inclined to transfer these interpretations to the Chinese figures standing on demons as those mentioned before. We noticed that in some of these the bull-face of Yama is still preserved, and that consequently this figure is Yama: hence we may infer that also the anthropomorphic figures standing on demons are derived from the same type. Compare also the four wood-carved Lokapāla posed on crouching demons in *Kokka*, No. 165, 1904.

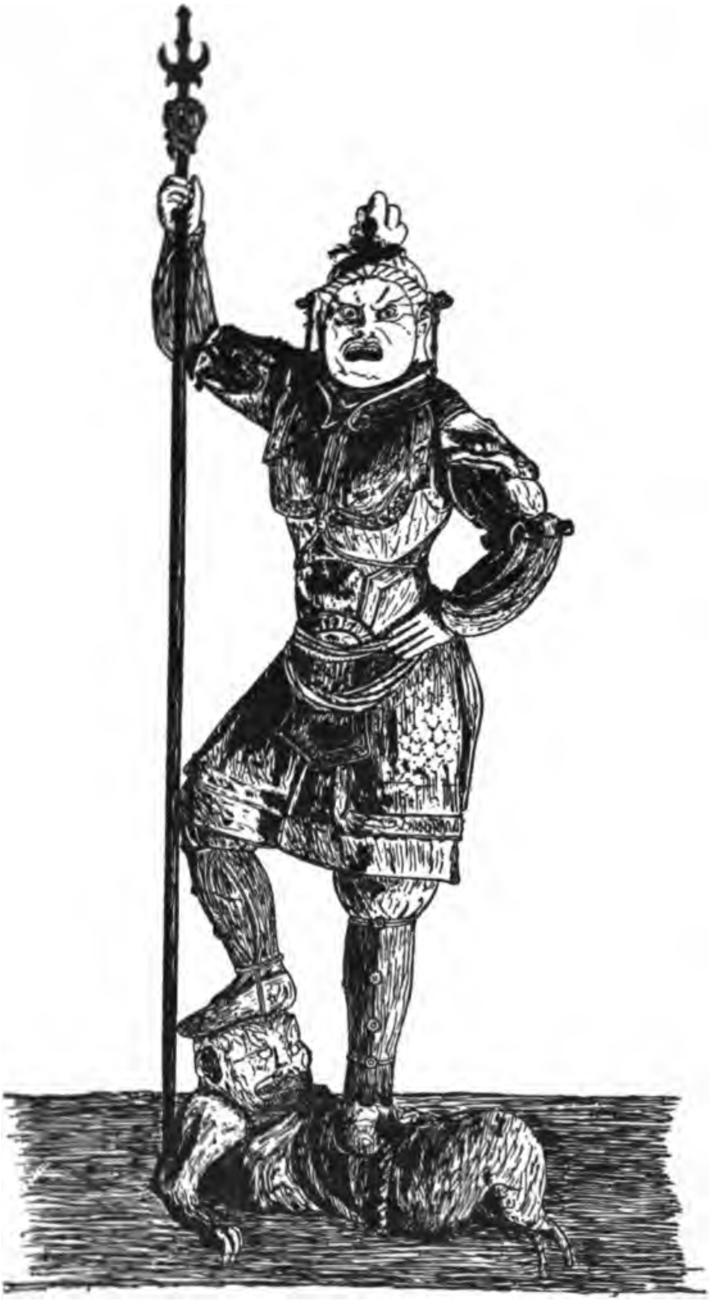

FIG. 46.
Japanese Colored Clay Statue of Dhṛitarāshṭra, Eighth Century (after *Kokka*).

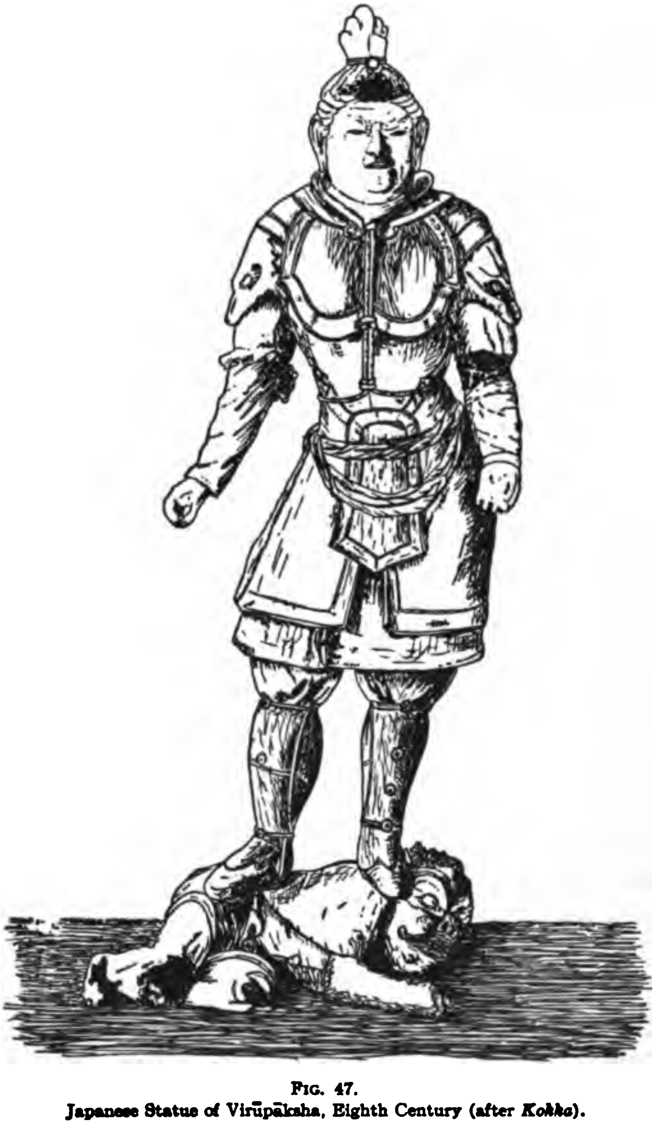

FIG. 47.
Japanese Statue of Virūpākṣha, Eighth Century (after *Kokka*).

armored; at the same time they are regarded as "protectors of religion" (Sanskrit *dharmapāla*), and for this reason are shown in so-called terrific forms.[1]

Analogous types of Lokapāla are met in the contemporaneous stone sculpture of China, for instance, in the caves of Lung-mên.[2] A marble relief (Plate LXI) in the Museum collection shows an armored Virūpāksha leaning on a two-edged sword, and holding a miniature Stūpa (tope) in his left hand.[3] The armor is very clearly represented: the breastplates tightly envelop the thorax, and are held in place by means of broad leather suspenders running over the shoulders and connecting with the dossière. The metal buckles fixed to the edge of the plastron are plainly visible, and tongues are passed through perforations of the straps. The ends of these straps reach the centre of either breastplate, and are strengthened at this spot by an additional piece of leather. The belt is a broad leather band starting in a rosette from the sternum, the end being turned upward from beneath the girdle.

It is of especial interest that similar clay figures representing Lokapāla (the term is perhaps too narrow, and should rather be Dharmapāla) have been discovered in Turkistan.[4] These are likewise enveloped by suits of armor much resembling those of the Chinese and Japanese clay statuettes. It is therefore obvious that in this case the question is not of any national type of armor which the Chinese applied to the clay figures, but that this armor was already peculiar to the latter when they were received in the channel of Buddhist art and reproduced by the potters of China. The art displayed in the caves of Tun-huang on the boundary of Turkistan and China may be made directly responsible for the transmission of this particular type from Turkistan to China; for there we find a statue of a Dharmapāla standing on a demon, and with exactly the same characteristics as our Chinese clay figures.[5] Was this armor ever a living reality in China, or did it merely remain an artistic motive? It is not very likely that it ever became of any practical use among the Chinese. It is not described in the official records of the T'ang dynasty; at least, in the records at our disposal no armor is described that could freely be recognized in it. Sheet armor, indeed, was never peculiar to China, but is plainly of western origin. Above all, this type of armor, even if it should have sparsely existed here and there in China during the T'ang, has left no trace in any later period; it does not survive in any harness of the Ming and Manchu periods; and this is a signal fact, as otherwise the T'ang tradition in regard to armor was still alive in that recent age.[1]

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[1] Styled in Sanskrit *krodha*, in opposition to *çānta*, the mild forms. A mild form of Yama seated on the back of a bull was painted by the Buddhist monk Eri, who died in 935 (reproduction in *Kokka*, No. 133, 1902).

[2] CHAVANNES, Mission, No. 353. Besides the hero and warrior type of Lokapāla, we have in the same period a nude type clad only with an apron, and with fine modelling of strong, well-developed muscles (*ibid.*, Nos. 358, 359). An excellent marble of the latter type is in the collection of Field Museum.

[3] Styled in Chinese "King of Heaven lifting a Stūpa" (*T'o t'a t'ien wang*).

[4] A. GRÜNWEDEL, Altbuddhistische Kultstätten in Chinesisch-Turkistan, p. 205.

[5] A. MAYBON, L'art bouddhique du Turkestan oriental, p. 55 (*L'art décoratif*, 1910).

Buddhism, however, may have influenced Chinese armature to a certain degree. A peculiar kind of armor styled "lion-armor" (*ni k'ai*) is attributed to the T'ang period.[2] The helmet and the coat are roughly figured in *T'u shu tsi ch'êng* (Fig. 48); but only the former is explained by a note to the effect that for each single piece five or six catties[3] of

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[1] In Japan, however, specimens of such armor, though very rare, do occur. BASHFORD DEAN (Catalogue of Japanese Armor, p. 52) has figured one exactly corresponding to the sheet armor of our clay statuettes. It is said to date about 1500, and "this form simulates the naked body and is known as the *Hotoke-dō* (saint's breastplate), an Indian saint being often represented with the body naked." This term means "Buddha's breastplate (*Hotoke* = Chinese *Fu*, "Buddha"), and clearly indicates that this armor was made in imitation of that represented on Buddhist statues. Among modern Indian armor, a very similar type is still found (W. EGERTON, Illustrated Handbook of Indian Arms, Plate XII, No. 587, and p. 124). A somewhat different type of iron sheet armor is figured by W. GOWLAND (The Dolmens and Burial Mounds in Japan, p. 48, Westminster, 1897; the same also in YAGI SHŌZABURŌ, Nihon Kōkogaku, II, p. 153, Tōkyō, 1898; and N. G. MUNRO, Prehistoric Japan, pp. 396, 417, Yokohama, 1908). It is likewise a harness composed of plastron and dossière which are formed of horizontal plates of iron skilfully forged and clinched together with iron rivets. Gowland makes the interesting and correct observation that both body armor and helmet are entirely different in form and construction from those of historical times, but that they agree very closely with the armor represented on the terra-cotta figures called *haniwa*. It is very interesting that the two TORII, in the publication previously mentioned (Etudes archéologiques, *Journal College of Science*, 1914, p. 73), figure such a *haniwa* with the description "cuirasse de style européen trouvée en Musashi, Japon." The Japanese authors, accordingly, are struck by the "European" character of this armor. It is now obvious that it has reached the East by way of Turkistan: consequently the *haniwa* adorned with this style of armor cannot be older than the age of the T'ang dynasty. Again we see in this example that the chronology of Japanese antiquities is in need of revision.

[2] AMIOT (Supplément à l'art militaire des Chinois, *Mémoires concernant les Chinois*, Vol. VIII, p. 373, Paris, 1782) was the first to describe this armor, but from a different source. Amiot styles it "cuirass in imitation of the skin of the animal called *ni* (resembling, it is said, the lion)."

[3] The *T'u shu tsi ch'êng*, deviating from its ordinary practice, does not state the source of this passage, which is evidently not extracted from a contemporaneous record of the T'ang period, which, however, seems to go back to a tradition of that time. The catty (*kin*) of the T'ang period is not identical with the present one. In the Museum collection there is a spherical bronze weight of the T'ang period (Cat. No. 116,892) inlaid with gold speckles and engraved with an inscription (the grooves of the characters being laid out with gold foil) yielding the date 672. The weight is stated in this inscription as being 1 pound (catty) 8 ounces, while it is 2 pounds in our weight. According to the present Chinese standard, it weighs 1 pound 11.32 ounces, or 27.32 ounces. Consequently 1 ounce of the T'ang period is equal to 1.138 modern Chinese ounce, and 1 pound of the T'ang period is equal to 18.24 ounces modern.

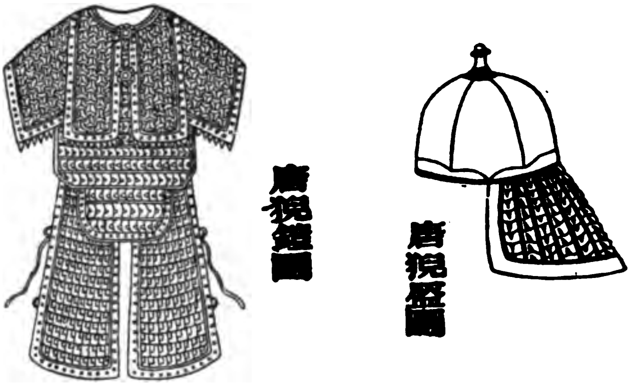

FIG. 48.
"Lion-Armor" and "Lion-Helmet" of the T'ang Period (from *T'u shu tsi ch'êng*).

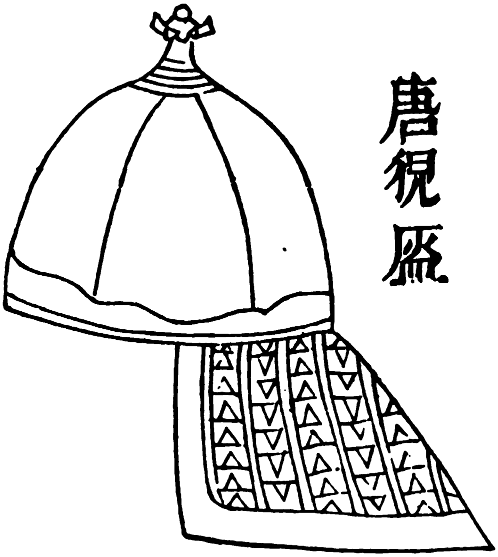

FIG. 49.
"Lion-Helmet" of the T'ang Period (from *Wu pei chi*).

pure iron mixed with one catty of steel are required, and that a skin cut in five layers, to the weight of two catties, is laid around this foundation.[1] The term *ni k'uei* is not interpreted in this passage; but this word *ni* occurs only in the combination *suan-ni*, designating the lion. We noticed above (p. 276) that Ma Sui of the eighth century fashioned helmets in the shape of lions. A lion-helmet (*suan-ni mou*) is mentioned as having been in the possession of General Han Shi-chung, who died in 1151.[2]

A similar helmet with the same designation is illustrated also in the *Wu pei chi*[3] (Fig. 49); and the descriptive text there given is identical with that of *T'u shu tsi ch'êng;* nevertheless the illustration of the latter is not derived in this case from that book, as the knob of the helmet and the number of plate-rows in the attached coif of the helmet are different, being six in the *T'u shu*, and five in the *Wu pei chi*. It will be noticed that the triangles on the plates are alternately drawn point upward or downward, and that the *T'u shu* begins with points downward, the other book with points upward: the two sketches must therefore come from different sources.

Still more curious is the fact that the *Wu pei chi*[4] illustrates an armor of a different design under the same name, *T'ang ni k'ai* (Fig. 50). While the two drawings agree fairly well in the upper portions, the breast and sleeve coverings, they are considerably at variance in the middle and lower parts, though notwithstanding both evidently represent the same type of armor. The cut of the *Wu pei chi* is identical with the one figured by AMIOT;[5] and the quaint text supplied by him is found there also. It runs thus: "The lion-armor of the T'ang. First, five catties of the 'plant penetrating into the bones'[6] and three catties of radish-seeds are mixed into a pap which is placed in clear water to the quantity of a hundred catties, and boiled till it bubbles two hundred times. The residue is removed, and five scales of the pangolin[7] are added; further,

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[1] Several designations for other kinds of helmets are added, and it is further said that in the south also old cotton is used in their making.

[2] GILES, Biographical Dictionary, p. 251. The passage alluded to above is contained in the biography of Han Shi-chung in the Annals of the Sung Dynasty (*Sung shi*, Ch. 364, p. 6 b). A "lion-armor" (*shi-tse kia*) is mentioned in the Annals of the Yüan Dynasty (*Yüan shi*, Ch. 79, p. 24 b, K'ien-lung edition).

[3] Ch. 105, p. 6.

[4] *L. c.*, p. 15.

[5] *L. c.*, Plate XXVIII.

[6] *T'ou ku ts'ao*, identified with *Mercurialis leiocarpa*, an euphorbiaceous plant (G. A. STUART, Chinese Materia Medica revised from F. Porter Smith's Work, p. 263, Shanghai, 1911).

[7] *Ch'uan shan kia*, the scaly ant-eater (*Manis tetra dactyla*). The word *ch'uan* is here written with the character 'river' (No. 2728) instead of No. 2739. This animal

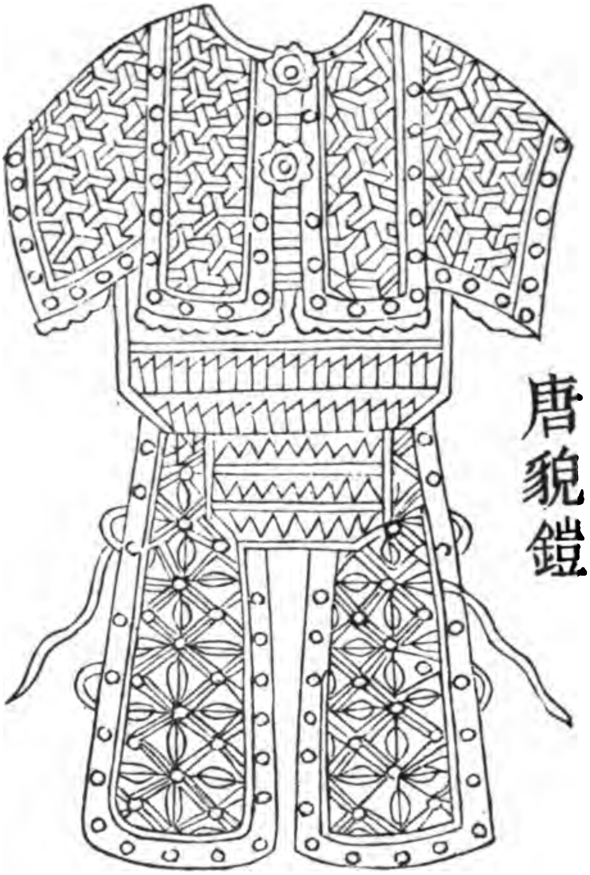

Fig. 50.
"Lion-Armor" of the T'ang Period (from *Wu pei chi*).

three catties of salt of Ta-t'ung, three catties of saltpetre, five ounces of stony nitre, and half a catty of sal-ammoniac. This mixture is tightly shut up in a kettle, and boiled for a day and night. Then the kettle is opened, and the mass is beaten with a leather ladle to secure various grades of thickness, and formed into the shapes of willow-leaves, fish-scales, square leaves, and rectangles. This armor has the advantage of being light in weight, and is much employed in the south."

This is apparently an alchemical recipe intended to produce a cut-proof body protection. The ingredients like the scales of the pangolin rest on sympathetic notions. Of course, it should not be understood with Amiot that the armor was manufactured from this substance; the illustrations show that the question is that of a substantial metal plate armor, although in the text it is a question of scales, and that the metal plates were covered with this essence. The idea of rendering the wearer invulnerable was perhaps responsible for the title of "lion-armor;" and this name, which conveys the impression of a rendering of Sanskrit *siṁhavarman*, savors of Indian-Buddhist influence. Indeed, on examining closely the two designs of this armor, we cannot fail to notice that it is identical with the one represented in the late Buddhist art of China during the Ming period, especially in the statues of Wei-t'o (Veda) and the Four Heavenly Kings, the guardians of the world and armed defensors of the Buddhist religion. Numerous specimens of these in all dimensions, carved from wood or cast in bronze, are in the Museum's collection; whatever their artistic and scientific interest may be, they have no value for the study of body armor which is mechanically copied in various conventional and stereotyped designs not properly understood by the artists.

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is an inhabitant of Fukien Province and Formosa, and has its trunk, limbs, and tail covered with large, horny, imbricated scales, which it elevates in rolling itself into a ball when defending itself against an enemy; the scales are medicinally employed (see J. H. EDWARDS, *China Review*, Vol. XXII, p. 714). Regarding the word "pangolin" see YULE and BURNELL (Hobson-Jobson, p. 668), and A. MARRE (Petit Vocabulaire des mots malays que l' usage a introduits dans les langues d'Europe, p. 11, Rome, 1866).

VII. HORSE ARMOR AND CLAY FIGURES OF HORSES

Steeds shielded with armor are alluded to as early as the *Shi king*. It appears that horses harnessed to the war-chariots were sometimes covered at that period with a means of defence,[1] which, judging from the use of the word *kiai* (compare p. 195) in this connection, seems to have been of the type of scale armor, the scales being cut out of thin strips of hide or leather. During the Ch'un Ts'iu period, the horses of the war-chariots were likewise armored.[2] This horse armor of the archaic epoch was a plain caparison, and widely different from the complex and composite armor which, as we know with certainty, existed in the Mongol period.

As to metal armor for horses (*ma k'ai*), we hear it mentioned for the first time toward the end of or shortly after the Han, in two small compositions of the famed usurper Ts'ao Ts'ao, who died in 220 A.D., and of his son Ts'ao Chi (192–232). The latter says that the ancient emperors bestowed on their servants certain kinds of armor styled "shining like ink" (*mo kuang*) and "brilliant lustre" (*ming kuang*), an armor with double seat in the trousers, an armor with rings and chains, and a set of horse metal armor (*ma k'ai*). This passage is very suspicious because of its retrospective character: the metal armor (*k'ai*), while it existed at the author's time, had not yet appeared in the days of the early emperors; and the word is here used thrice consecutively with reference to them. The "ring and chain armor," as previously pointed out (p. 174), is an isolated instance in this period, and smacks of anachronism. For this reason also the metal horse mail must be looked upon with diffidence, and I am not inclined to attribute much importance to this text.

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[1] Legge, Chinese Classics, Vol. IV, pp. 131, 194. Legge translates in the one case "the chariot with its team in mail," and in the other case "his mail-covered team," explaining that the mail for the horses was made of thin plates of metal, scale-like. This interpretation is erroneous. The same misconception occurs in S. Couvreur's translation of the *Shi king* (p. 136), "les quatre chevaux munis de minces cuirasses de métal," and is adopted by Giles (No. 1734); while in the other passage Couvreur (p. 90) is correct in translating "les quatre chevaux munis de cuirasses," provided *cuirasses* is taken in its literal sense of "hide armor." It is impossible to assume that during a period when metal armor for the protection of the human body was entirely unknown, it should have been utilized in guarding a horse. Man of that age could conceive and employ no other armor for his horse than for himself; and since he was acquainted only with plain hide armor and hide scale armor, these two types must have served likewise for the horse, the term *kiai* being in favor of scale armor. The translations of the two passages of *Shi king* have to be corrected accordingly. The frontlets on the foreheads of the horses (*yang*, No. 12,882), once mentioned in *Shi king* (Legge, Chinese Classics, Vol. IV, p. 547) and once in *Tso chuan*, did not form part of an armor, but were metal ornaments which served for purely decorative purposes, and emitted pleasing sounds when the animal moved.

[2] Legge, *l. c.*, Vol. V, p. 345.

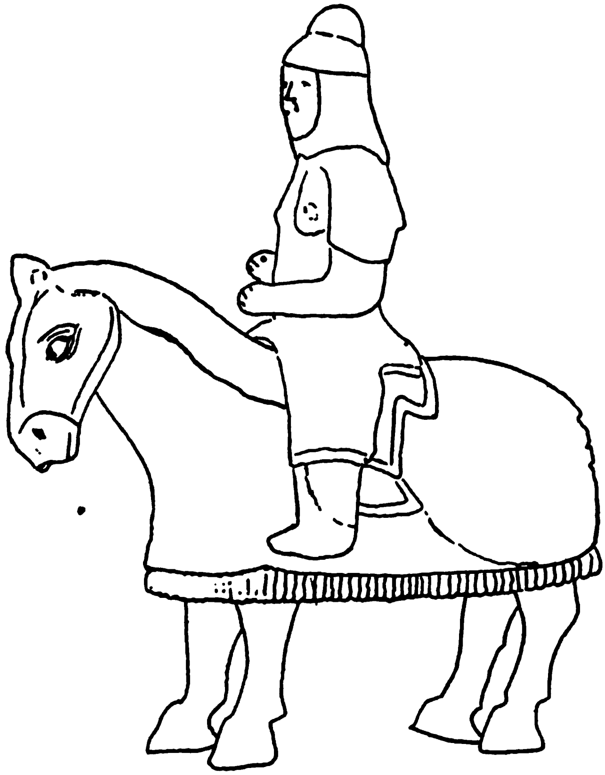

FIG. 51.
Armored Cavalier on Caparisoned Horse, Clay Figure in Collection of Mr. G. Eumorfopoulos, London (after Burlington Fine Arts Club, Exhibition of Early Chinese Pottery, Plate IV).

In 519 A.D., A-na-kuai, the King of the Juan-juan,[1] presented to the Emperor Su-tsung of the Wei dynasty one set of fine and brilliant[2] mail complete for man and horse (*jên ma k'ai*), and six sets of iron mail for man and horse.[3]

Caparisoned war-horses are repeatedly mentioned in the History of the T'ang Dynasty. The rebel Kao K'ai-tao, who conquered Yü-yang in 618 and styled himself Prince of Yen, for example, was in possession of several thousand mail-clad horses and ten thousand men.[1] Among the types of armor officially established by the T'ang dynasty we find also "horse cuirasses" (*ma kia*); and a charger caparisoned in this manner appears in a contemporaneous clay figure (Fig. 51) coated with a yellow glaze. The armor covers the war-horse almost down to its knees; and as it appears as a solid mass without any divisions, it may be one of hide (also the rider apparently wears a hide armor); it is possible, however, that the hide is merely the exterior cover, and is placed over an armor of solid plate mail indicated by the row of laminæ along the lower edge.[2]

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[1] He committed suicide in 552, after having been vanquished by the Turks (HIRTH, Nachworte zur Inschrift des Tonjukuk, p. 110).

[2] This attribute is invariably used with reference to iron armor with varnished or polished plates.

[3] *Pei shi*, Ch. 98, p. 6.

Under the Sung dynasty the horses received facial masks of copper.[3] According to *Ts'e fu yüan kuei*, Chang Yen-tsê, Governor of King-chou,[4] presented in 942, on his arrival at the capital, in order to show his gratitude for favors received, nine horses, and again fifty horses together with silver saddles and bridles, and iron armor for the protection of the faces of horses and men; at a later date he presented fifty horses with gold saddles and bridles, with complete armor for the horses and men.

The furniture of the horses of the Mongols is described by the Franciscan Plano Carpini in 1246.[5] It was of two kinds,— iron plate mail, as described in Chapter V, and leather scale armor. The latter consisted of five parts,— the body armor in two halves extending from the head to the tail, and fastened to the saddle, a protection for the croup, a neck-guard, a breastplate reaching down to the knees, and an iron lamina on the forehead (being the chanfrin).

In another passage the same writer says that many of the horses of Kuyuk had bits, breastplates, saddles, and cruppers, quite twenty marks' worth of gold.[6] The Armenian historian Haithon states that the horses of the Mongols, like their riders, were clothed with leather armor.[7]

Interesting illustrations depicting the single pieces making the complete furniture of the horse are preserved in the *Wu pei chi* (Figs. 52–54)

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[1] *T'ang shu*, Ch. 86, p. 4 b.

[2] Also among the Moghuls the horses were first covered with mail, over which was put a decorated quilt (see H. BLOCHMANN, Ain I Akbari, Vol. I, Plate XIV, and the explanation on p. XI).

[3] *Sung shi*, Ch. 197, p. 2.

[4] In Kan-su Province (PLAYFAIR, Cities and Towns of China, 2d ed., No. 1112).

[5] Edition of G. PULLÈ, p. 87 (*Studi italiani di filologia indo-iranica*, Vol. IX, Firenze, 1913). This passage is lacking in the former editions of Carpini.

[6] W. W. ROCKHILL, The Journey of William of Rubruck, p. 20.

[7] G. ALTUNIAN, Die Mongolen und ihre Eroberungen, p. 81 (Berlin, 1911).

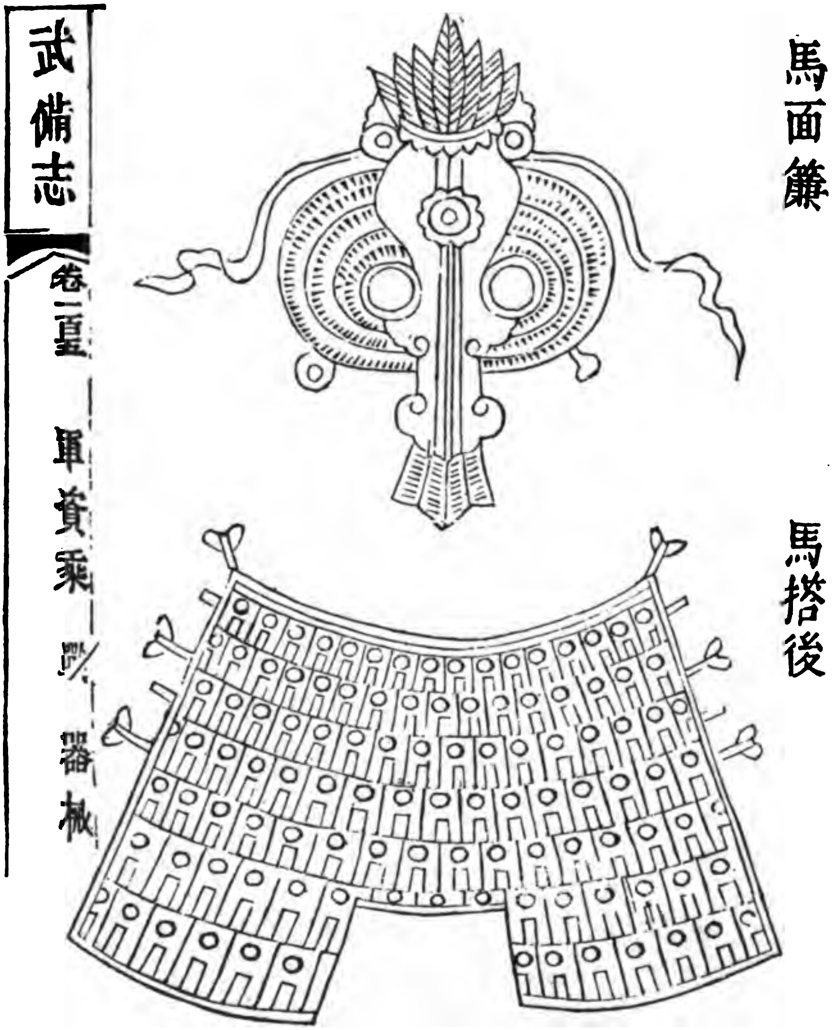

FIG. 52.
Chanfrin and Armor for the Croup of a Horse (from *Wu pei chi*).

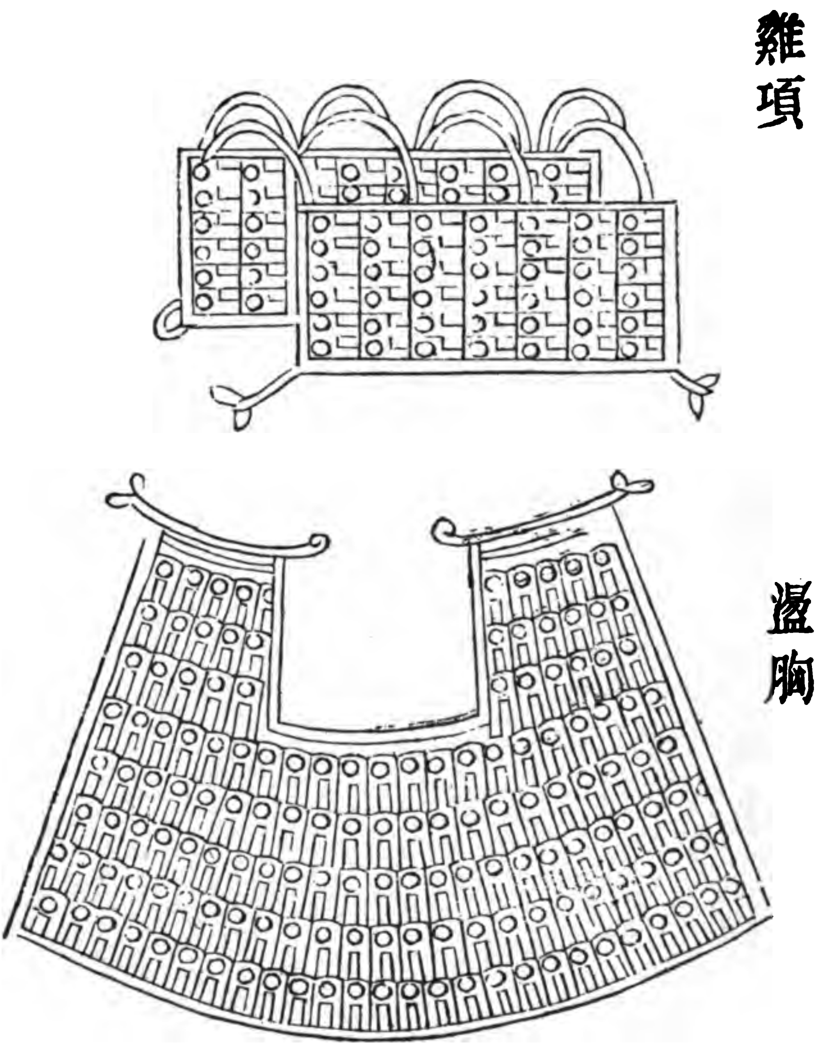

FIG. 53.
Neck-Guard and Breastplate of Horse (from *Wu pei chi*).

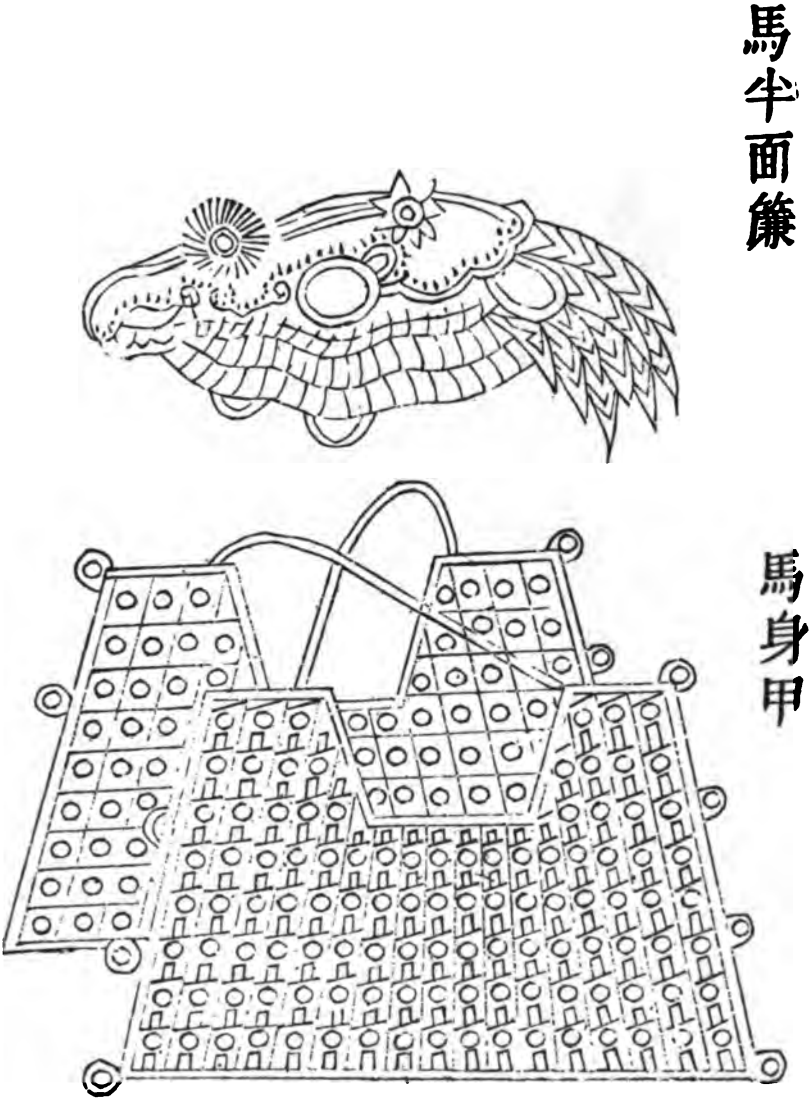

FIG. 54.
Half-Chanfrin and Trunk Mail of Horse (from *Wu pei chi*).

of 1621, where no description of them, however, is given. The armor parts for the croup, neck, breast, and trunk, consist of plate mail; they represent the tradition of the Ming period, and may be identical with those of the Yüan. It is not known to me whether horse armature was still employed under the Manchu dynasty. Fig. 55 is here inserted after CIBOT; from what Chinese source this illustration is derived I do not know. It is interesting as showing a horse with complete equipment, — a facial mask or frontal with chanfrin of scale armor, neck and shoulder guards of plate mail, and a chabraque enveloping the trunk.

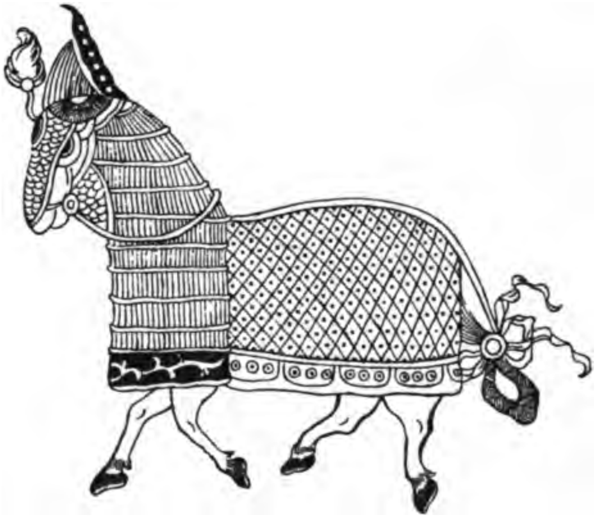

FIG. 55.
Chinese Sketch of Caparisoned Horse (from L. P. Cibot, Lettre sur les caractères chinois, Brussels, 1773).

From what has been set forth above in regard to the relations between Irān and China, it appears also that Chinese horse mail might have been influenced from the same direction. This influence is very probable; but the discussion of this matter may be left for the present, as it is preferable to wait until a thorough investigation of Iranian horse mail has been made by a competent specialist; ample material for such study is particularly furnished by the Persian miniatures.[1]

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[1] In an illuminated manuscript of the Shāh-nāmeh preserved in the Royal Library of Munich, and representing the costume and arms of the Persians in the seventeenth century, according to Egerton, the combatants generally wear conical helmets with solid guards over the neck and ears. The horses as well as their riders have a complete covering of mail with alternate rows of gold and silver scales (W. EGERTON, Ill. Handbook of Indian Arms, p. 142). In ancient India, elephants and horses were protected by armor (G. OPPERT, On the Weapons, Army Organization, and Political Maxims of the Ancient Hindus, p. 8, Madras, 1880). The Chinese

Numerous clay figures of horses and cavaliers have been unearthed in recent years from the graves of Shen-si and Ho-nan, and a brief description of these may find a suitable place here. Particulars in regard to the history of the burial of such clay figures and their significance will be given in Part II. The observation of the local differentiations is an essential point of view to be pursued in the study of these clay figures.

The divergence between the grave-finds of Ho-nan and Shen-si is peculiarly manifest in the horses. Those of Shen-si usually represent the bare horse in a sober and mechanical conception;[1] those of Ho-nan illustrate more realistic types, always harnessed, in a variety of poses effected particularly by manifold turns of the neck. Most of the horses are posed on a flat rectangular clay base. Among seven clay horses of miniature size acquired by the writer at Si-ngan fu, six are almost identical, while the seventh is differentiated only in that the mane is coarsely fashioned. The horse on Plate LXII is an exception, being somewhat better shaped, and coated with soft lead glazes in three colors, — a deep brown, a light yellow, and a plant green; also saddle and saddle-cloth are represented (but not the stirrups); the saddle is padded with a textile material gracefully draped on both sides. The horse shown on Plate LXIII excels by its massive dimensions, but is otherwise the outcome of the routine work of an ordinary craftsman. The Ho-nan horses, on the other hand, appeal to us by the gracefulness of their motions, and the variety of actions in which they are represented (Plates LXIV, LXV); also the details of the harness are better and more efficiently worked out. In the horse on Plate LXVI, the trappings with their ornaments in metal, the tinkling bells on the breastband, as well as the lotus-flower designs on the crupper, are neatly moulded in relief.

The clay figure of the horse on Plate LXVII, found in fragmentary condition north of the city of Ho-nan fu in 1910, is notable for its unusual dimensions and its perfect glazing.[2] The natural coloration of the animal is reproduced by a light-yellow soft lead glaze; the saddle, of the

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pilgrim Hüan Tsang reports that the Indian war-elephants were covered with strong armature (S. BEAL, Buddhist Records of the Western World, Vol. I, p. 82). In Tibet the high officers sometimes clothe their horse with armor, and a set was captured by the British expedition under Colonel Younghusband. A Tibetan cavalryman whose horse is clad with chanfrin, neck and breast guard, is pictured in WADDELL's Lhasa and its Mysteries (Plate opp. p. 168).

[1] Sometimes a mere saddle is represented without any other trappings; such a horse will be figured in Part II as forming part of a complete set of finds from the same grave.

[2] The technique and colors of these glazes are identical with those on the statue of the Arhat recently acquired by the British Museum, and ably described by R. L. HOBSON (*Burlington Magazine*, Vol. XXV, 1914, pp. 69–73). The excellent colored plate accompanying this article affords a good view of the T'ang potter's glazes.

same form as the one in use at present, is glazed a plant green; the double saddle-cloth underneath it, dark brown intermingled with green. The seat of the saddle is padded with a material arranged in graceful drapery. The mane is brown; the ornamental metal pieces attached to the headstall, the breastband, and crupper are glazed green. The design which is brought out on these is characteristic of the T'ang period, and found also as relief decoration on coeval pottery vases.[1]

The horses on which human figures are mounted occupy a special place. Their significance in relation to the dead may be ascertained from their position in the grave: they were found either as preceding or as following the coffin. This seems to allude to the fact that they were regarded as the mounted escorts of the occupant of the grave, in the same manner as the living one, when on an official visit riding in a cart or in a sedan-chair, is accompanied by outriders in front and in the rear. As only persons of rank were granted this privilege, it seems certain that the same rule was observed in the grave, and that the clay statuettes of cavaliers appertain to dignitaries.

From Shen-si only figures of male riders are known to me (Plates LXVIII–LXX). The Shen-si horses are of somewhat stronger build, taller, and with more developed chests, than the Ho-nan breed. In the former, the curly hair on the forehead is parted and combed toward the sides, while in the latter it hangs straight downward. The men wear a pompon in the front of their round caps, and are strangely clad in long gowns. The cavalier on Plate LXVIII makes a poor figure as a horseman, and shows that the Chinese of the T'ang period had as poor a knowledge of the art of riding as at present. The women of Ho-nan are better seated in the saddle than the men of Shen-si. The rider in question has his left foot pushed forward and his right foot backward; his hands come too near to the horse's neck, and seem to be in motion.

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[1] An illustration of such a vase will be found in Part II. Chinese horse-trappings of the T'ang period may be viewed in Tōyei Shukō, Vol. III, Plates 196, 197. In none of the clay figures which have come to my notice is the saddle-girth represented. Judging from the clay figures, saddlery must have been almost the same in the T'ang period as at present. The frame of the modern saddle is carved from wood, frequently covered with shagreen and edged with metal-work, usually iron incrusted with silver wire forming geometric or floral designs. The seat is padded with a blue or red satin or velvet cover. There are, as a rule, two saddle-cloths, the lower one of wadded cotton cloth, the upper either of leather, ornamented with designs in color or appliqué patterns, or of wool or silk carpeting. A single bridle of cotton webbing is used. Headpiece, breastband, and crupper are usually decorated with brass work, or sometimes with silver gilt. A neckcollar fitted with small brass bells is occasionally added. Two tassels of red-dyed horse-hair are suspended, the one from the breastband, the other from the band under the chin. The stirrups are large and heavy with solid bases ellipsoid in shape, usually of iron damaskeened with silver, more rarely of brass. In Kan-su and north-eastern Tibet, wooden stirrups were also observed and collected by the writer; these are made as substitutes only when iron is lacking. Compare also Plate XXII.

Whoever has observed Chinese riding will have witnessed such performances; and in this case the potter must be granted all credit for his power of observation. There is another type of mounted soldier from Shen-si, whose left hand appears as if seizing the bridles, while he is pressing his right hand against his chest (Plate LXIX, Fig. 2).

The figure on Plate LXX is curious in exhibiting a helmeted soldier rising in the saddle in an upright position, in order to salute by lifting his folded hands to the height of his face. The headstall of the horse is decorated with floral ornaments, probably chased in metal.

In the Ho-nan types, the horses prick up their ears; their necks are elegantly curved; the manes are either upright, or falling down to the right side, and are carefully modelled. In all Ho-nan figures of riders known to me, the stirrups are represented.[1] Fig. 1 of Plate LXIX illustrates a female rider very well seated; the body of the clay is coated with a yellowish-green glaze, and the mane of the animal is well treated; but the form of the head is bad. In the figure on Plate LXXI the mane of the steed is painted vermilion. The woman[2] wears male attire, a girdled coat with triangular lapels (as in our man's clothing), trousers, and boots; she is sitting straight and with arms crossed, the short sleeves rendering the hands visible. The saddle-cloth is painted with small circles in black ink, and thus is presumably intended for a panther's skin. The reins and crupper likewise are so decorated, and there are a few black circles on the neck of the animal. The stirrups are represented.

The horse illustrated on Plate LXXII is fairly well modelled. The neck is painted red, and overstrewn with white spots. Headstall and bridle are painted in black outlines, while the crupper is brought out in relief. The muscles of the head, the nostrils, the jaws (agape), teeth, and tongue are carefully modelled. The woman, almost Japanese in expression, wears a flat cap, from which a long ribbon is floating down her back. Her dress is painted a brown-red. Her right arm is hanging down, her left hand is raised to seize the bridles. The saddle-cloth seems to be a cotton quilt.

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[1] As has already been shown by F. HIRTH (*Zeitschrift für Ethnologie*, 1890, Verhandlungen, p. 209), stirrups were in vogue during the T'ang period; the people availed themselves of iron stirrups, those of the dignitaries were made from the metal alloy called *t'ou-shi*.

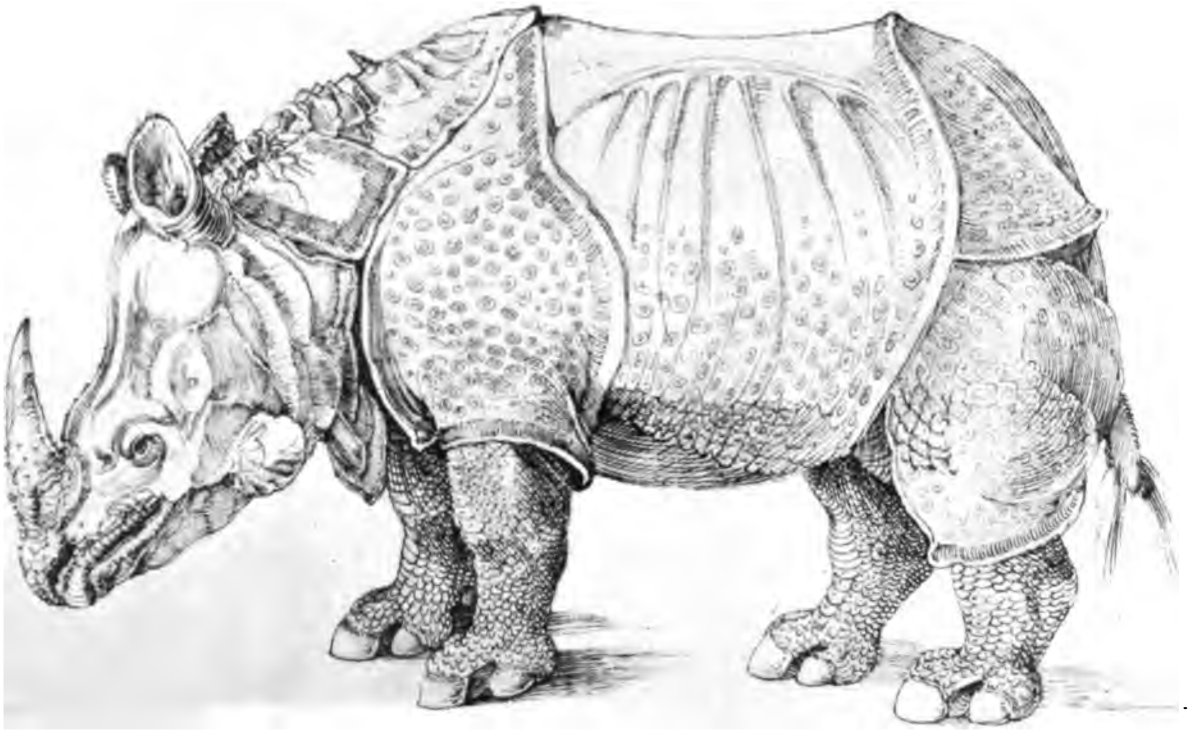
[2] Horseback-riding was a common exercise for women in the T'ang period. Female equestrians were represented by pictorial art. Yang Kuei-fei was painted in the act of mounting on horseback (GILES, Introduction to the History of Chinese Pictorial Art, p. 50). In the Gallery of the Sung Emperors there was a picture by Chang Süan, representing a Japanese woman on horseback (*Süan ho hua p'u*, Ch. 5, p. 6).

PLATE IX.

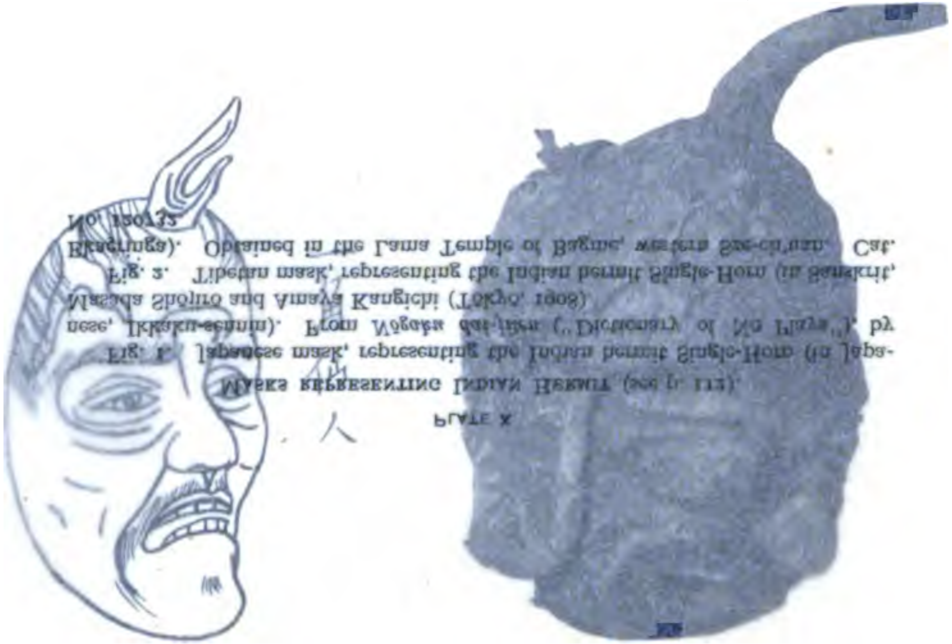
DÜRER'S RHINOCEROS (see p. 83).

(After a Photogravure published by the British Museum, London.)

In 1515 Albrecht Dürer made the sketch of an Indian rhinoceros which had been shipped from India to King Emanuel of Portugal. The original is preserved in the British Museum, London, and bears from the hand of the artist the title "Rhinoceron 1515," and an explanation written in German along the lower edge of the picture.



THE RHINOCEROS BY ALBRECHT DÜRER 1515.



1 2

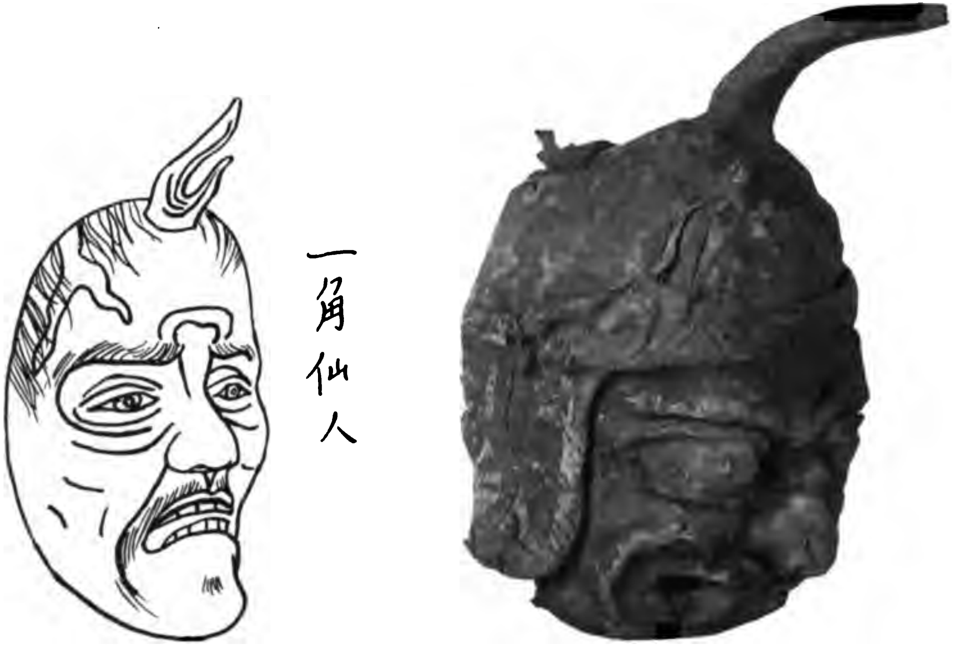
JAPANESE AND TIBETAN MASKS OF THE HERMIT SINGLE-H

PLATE X.

MASKS REPRESENTING INDIAN HERMIT (see p. 112).

Fig. 1. Japanese mask, representing the Indian hermit Single-Horn (in Japanese, Ikkaku-sennin). From *Nōgaku dai-jiten* ("Dictionary of Nō Plays"), by Masada Shōjirō and Amaya Kangichi (Tōkyō, 1908).

Fig. 2. Tibetan mask, representing the Indian hermit Single-Horn (in Sanskrit, Ekaçṛiṅga). Obtained in the Lama Temple of Bagme, western Sse-ch'uan. Cat. No. 120732.



1 2

JAPANESE AND TIBETAN MASKS OF THE HERMIT SINGLE-HORN.

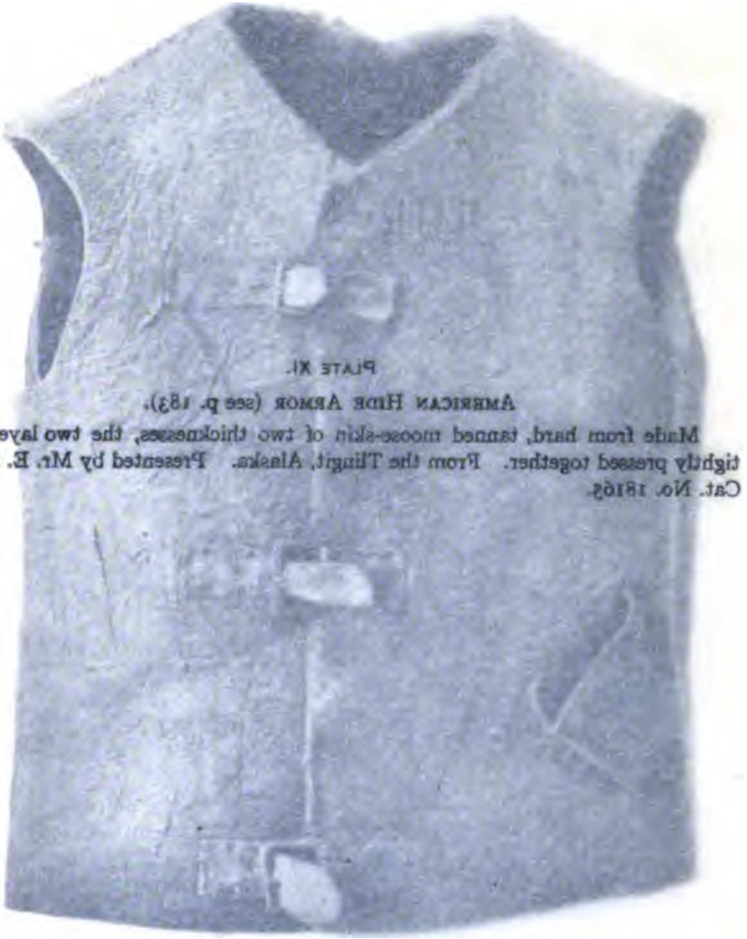
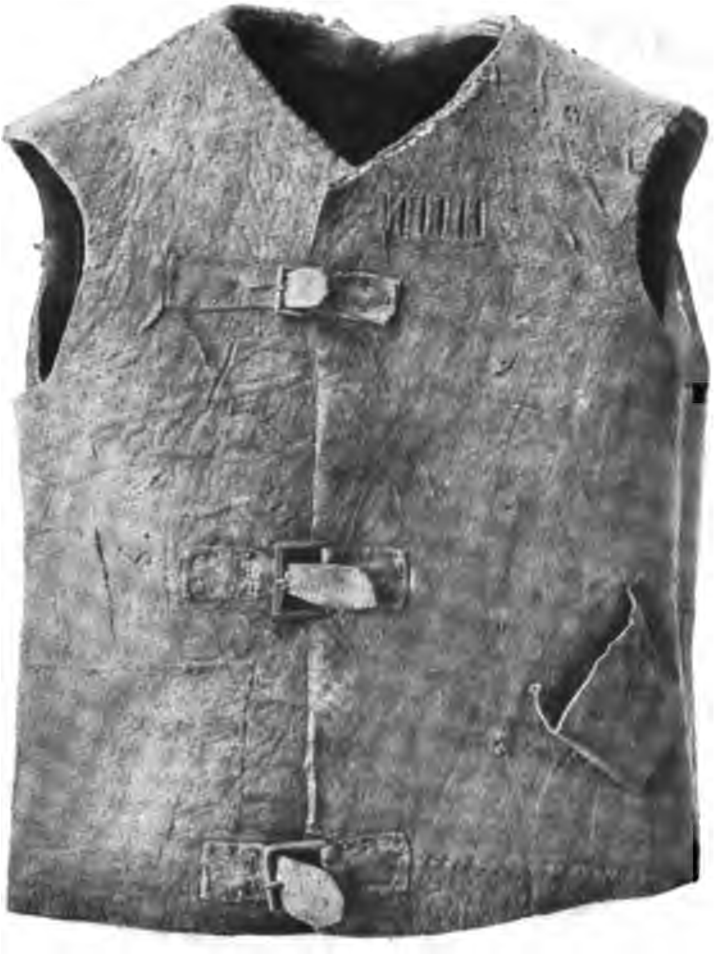


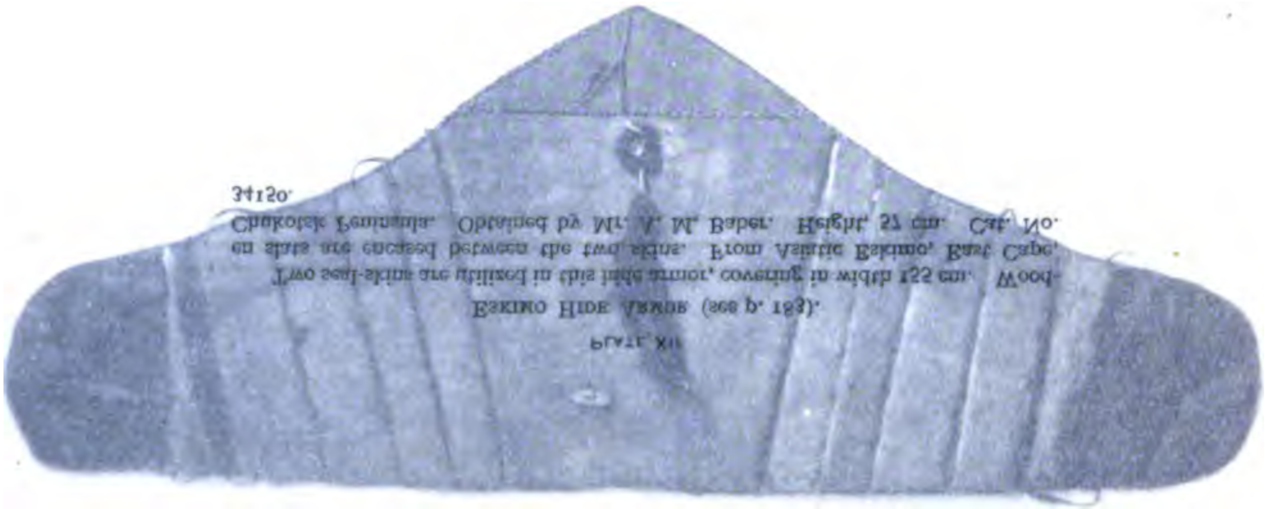
PLATE XI.

AMERICAN HIDE ARMOR (see p. 183).

Made from hard, tanned moose-skin of two thicknesses, the two layers being tightly pressed together. From the Tlingit, Alaska. Presented by Mr. E. E. Ayer. Cat. No. 18165.



TLINGIT HIDE ARMOR.

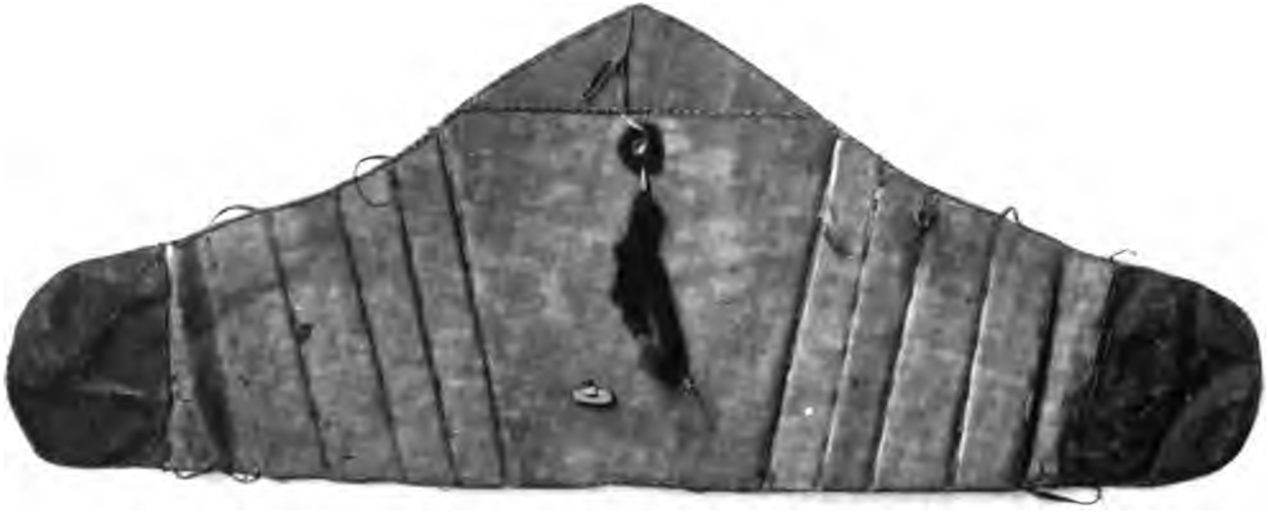


HIDE ARMOR OF ASIATIC ESKIMO

PLATE XII.

ESKIMO HIDE ARMOR (see p. 183).

Two seal-skins are utilised in this hide armor, covering in width 155 cm. Wooden slats are encased between the two skins. From Asiatic Eskimo, East Cape, Chukotsk Peninsula. Obtained by Mr. A. M. Baber. Height, 57 cm. Cat. No. 34150.



HIDE ARMOR OF ASIATIC ESKIMO.

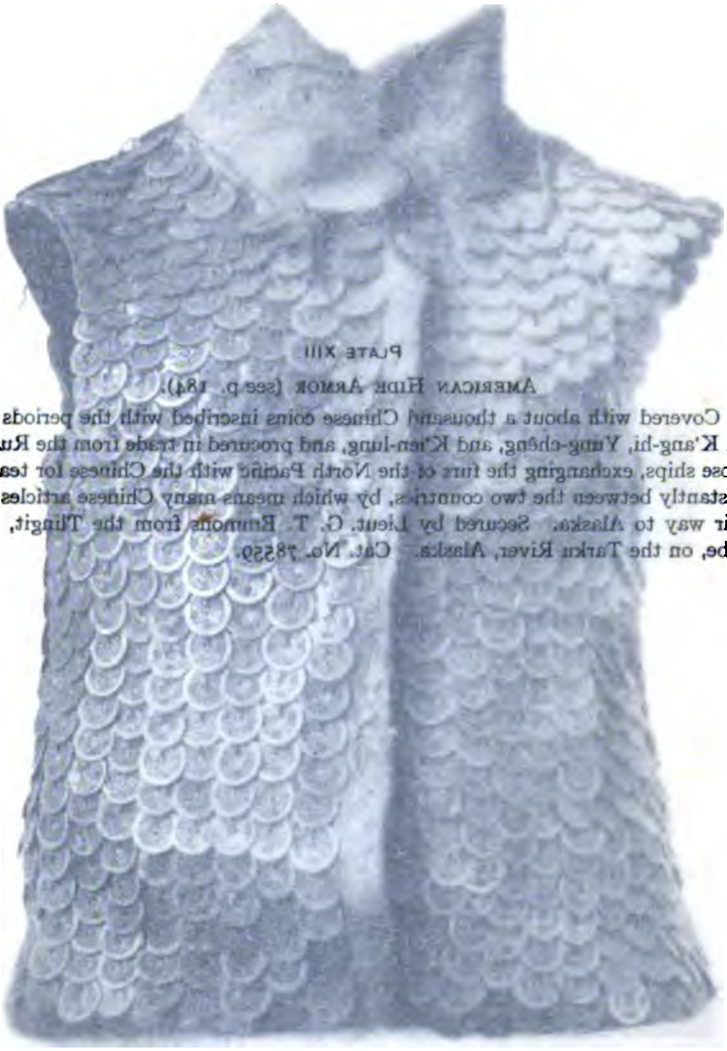
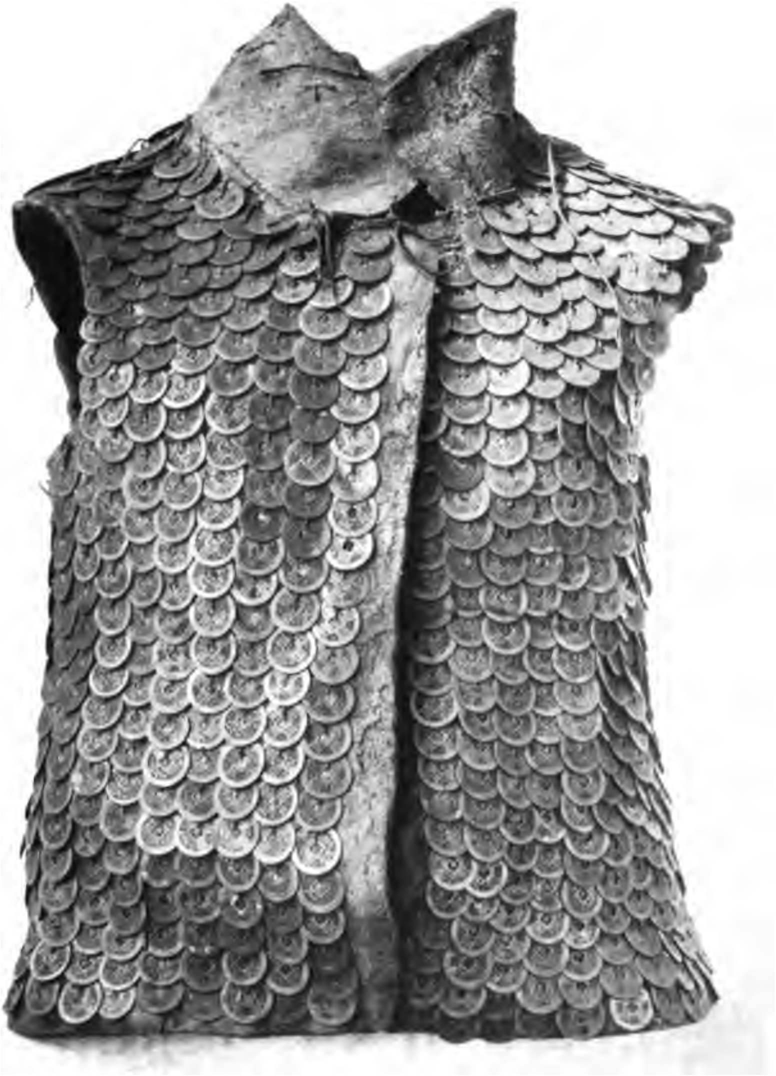


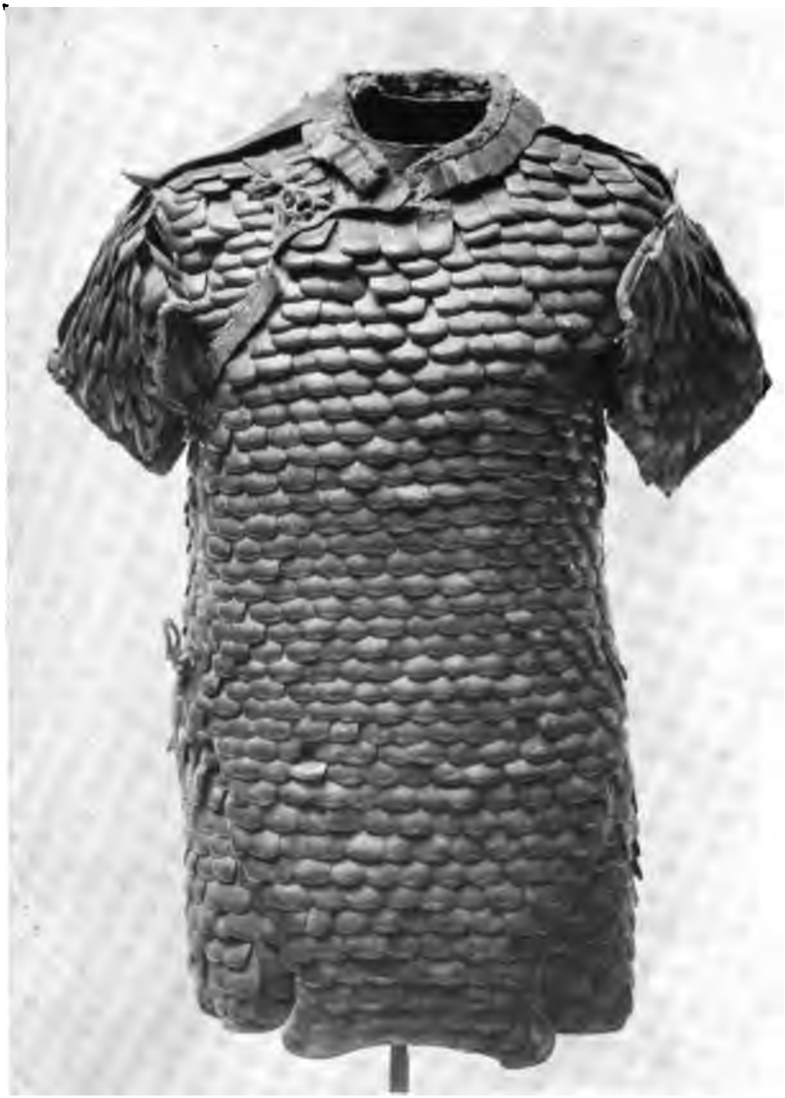
PLATE XIII.

AMERICAN HIDE ARMOR (see p. 184).

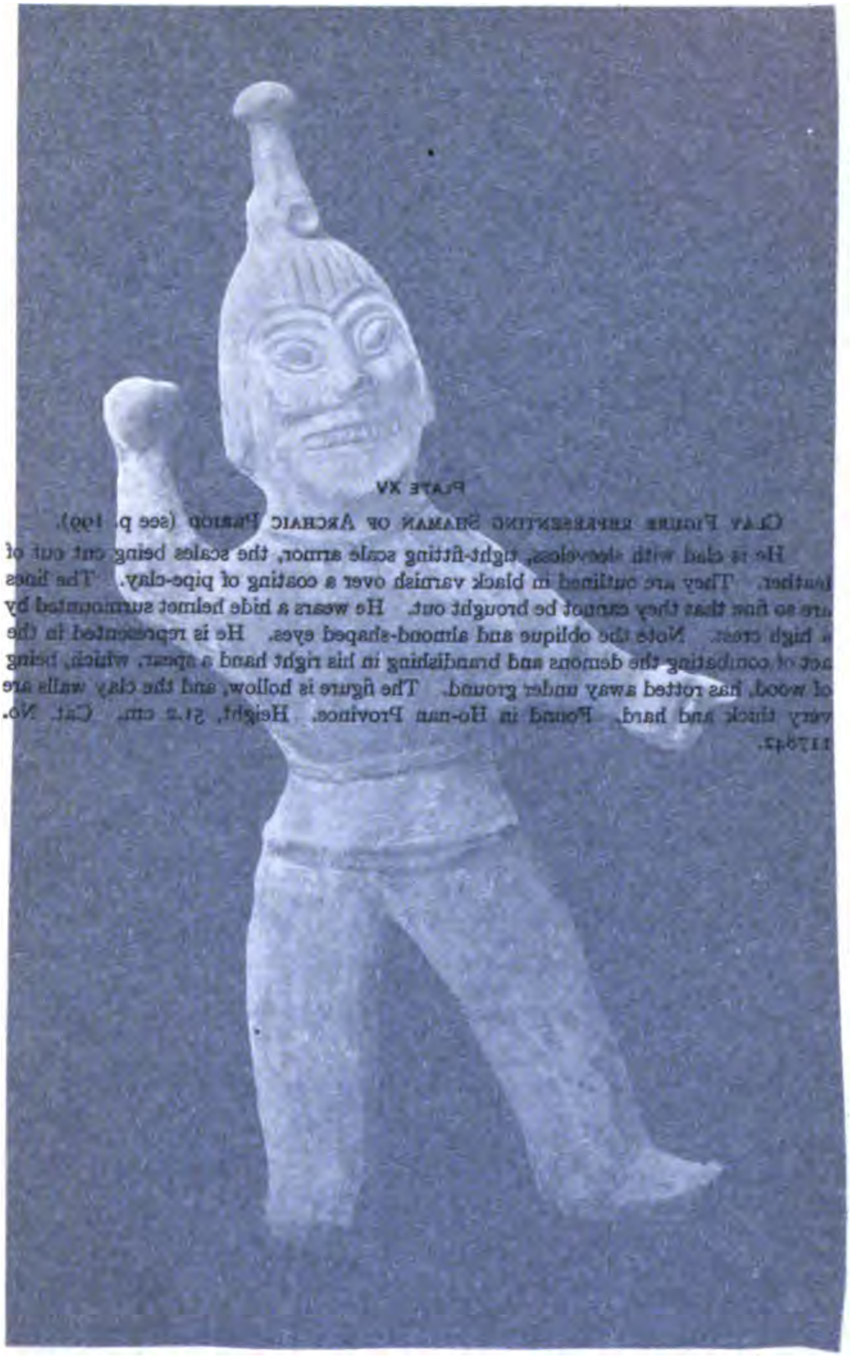
Covered with about a thousand Chinese coins inscribed with the periods Shun-chi, K'ang-hi, Yung-chêng, and K'ien-lung, and procured in trade from the Russians, whose ships, exchanging the furs of the North Pacific with the Chinese for tea, plied constantly between the two countries, by which means many Chinese articles found their way to Alaska. Secured by Lieut. G. T. Emmons from the Tlingit, Tarku Tribe, on the Tarku River, Alaska. Cat. No. 78559.



TLINGIT CUIRASS COVERED WITH CHINESE COINS.



Chinese Armor of Copper Scales.

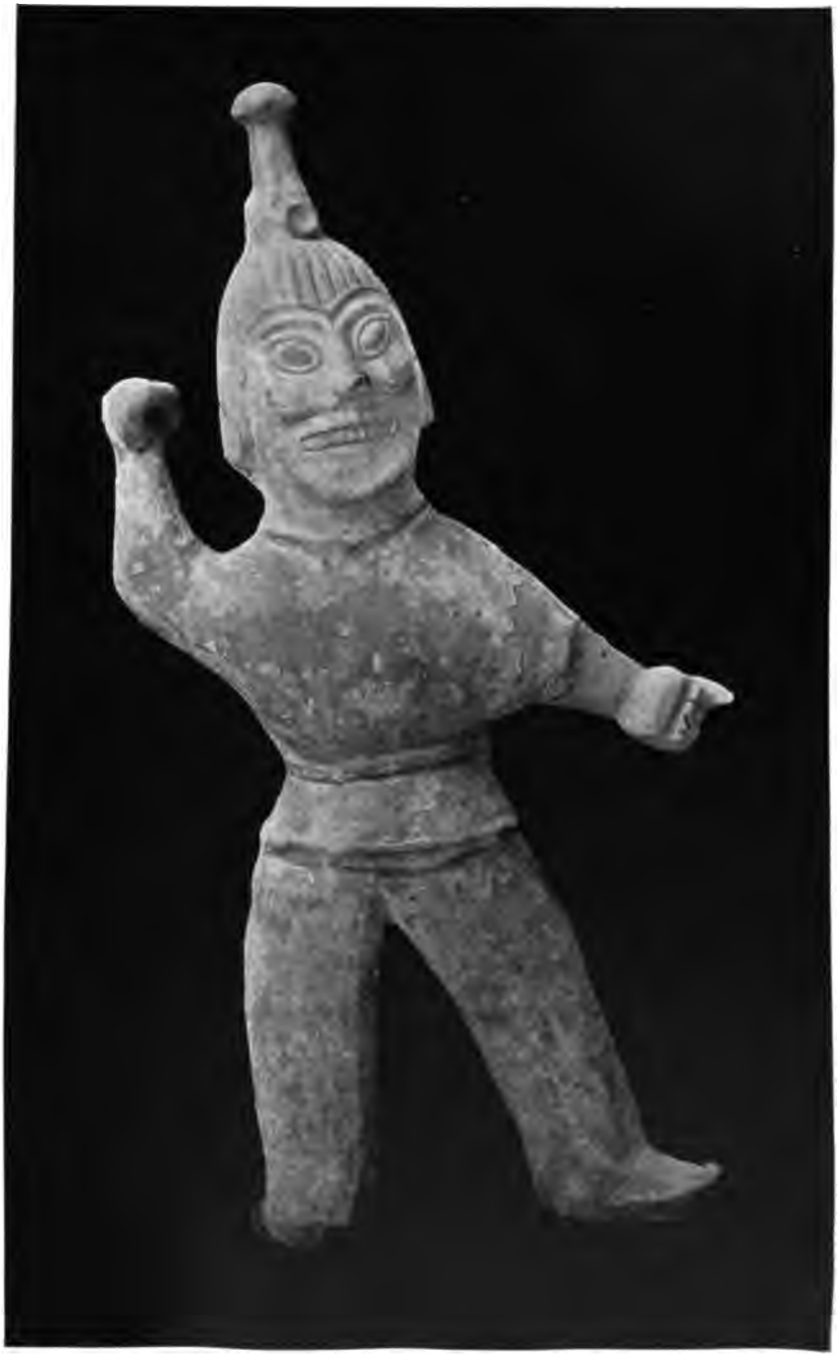


CLAY FIGURE REPRESENTING SHAMAN.

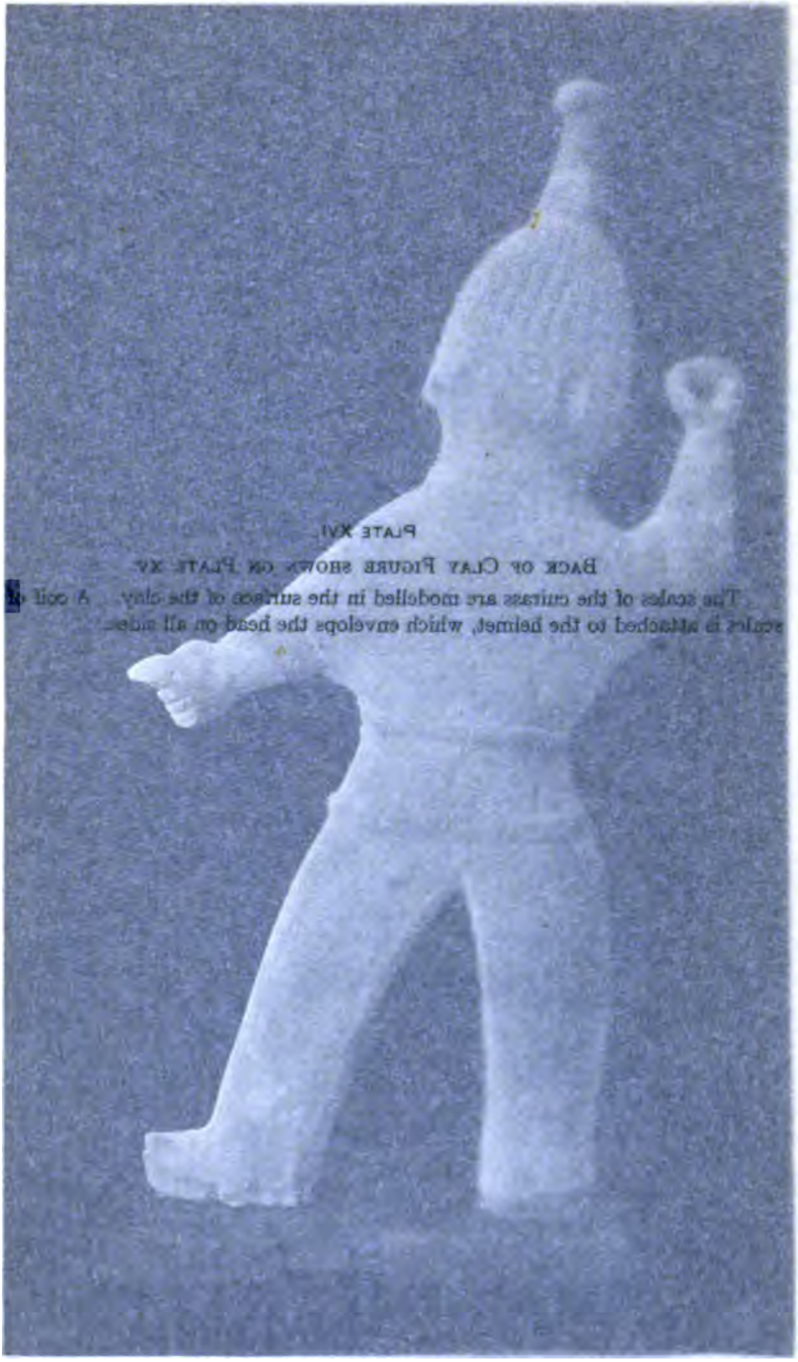
PLATE XV.

CLAY FIGURE REPRESENTING SHAMAN OF ARCHAIC PERIOD (see p. 199).

He is clad with sleeveless, tight-fitting scale armor, the scales being cut out of leather. They are outlined in black varnish over a coating of pipe-clay. The lines are so fine that they cannot be brought out. He wears a hide helmet surmounted by a high crest. Note the oblique and almond-shaped eyes. He is represented in the act of combating the demons and brandishing in his right hand a spear, which, being of wood, has rotted away under ground. The figure is hollow, and the clay walls are very thick and hard. Found in Ho-nan Province. Height, 51.2 cm. Cat. No. 117842.



CLAY FIGURE REPRESENTING SHAMAN.

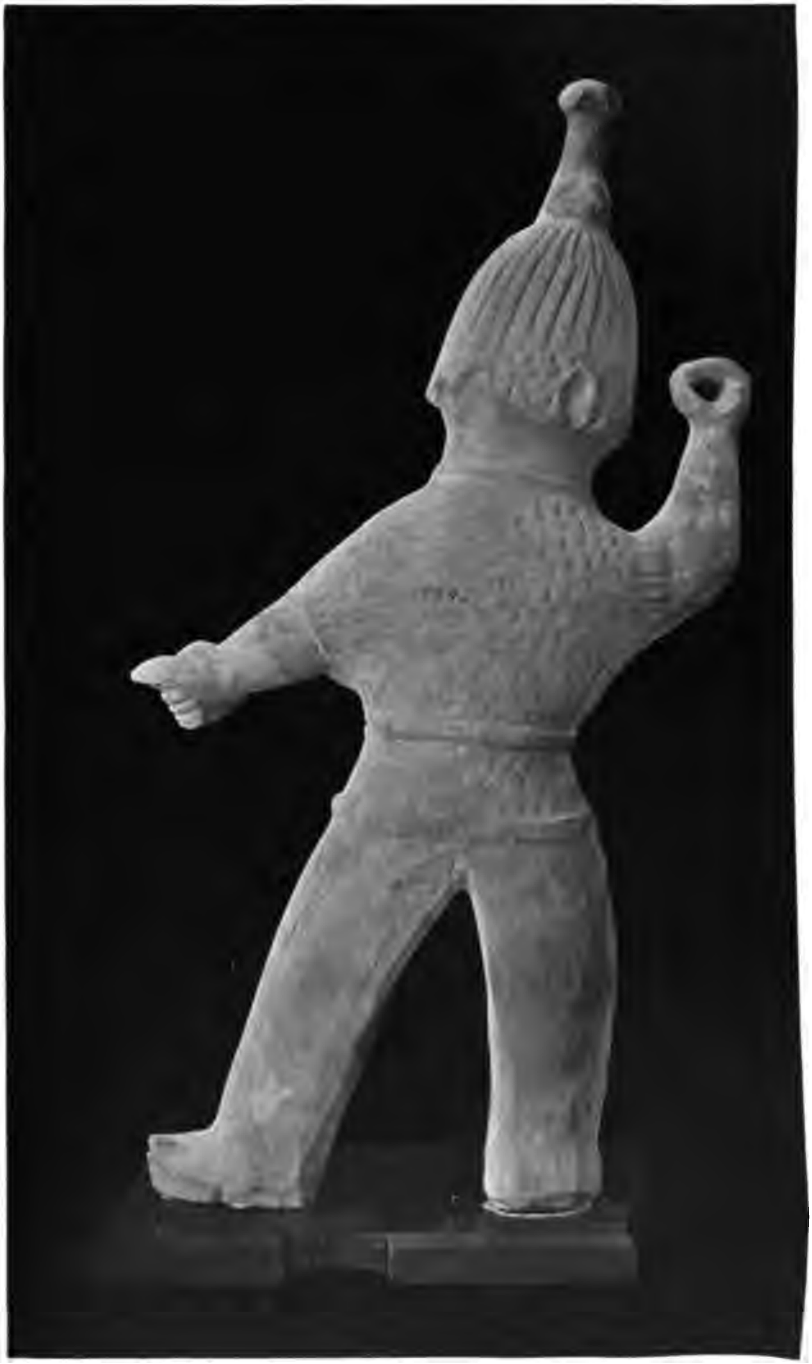


BACK OF CLAY FIGURE

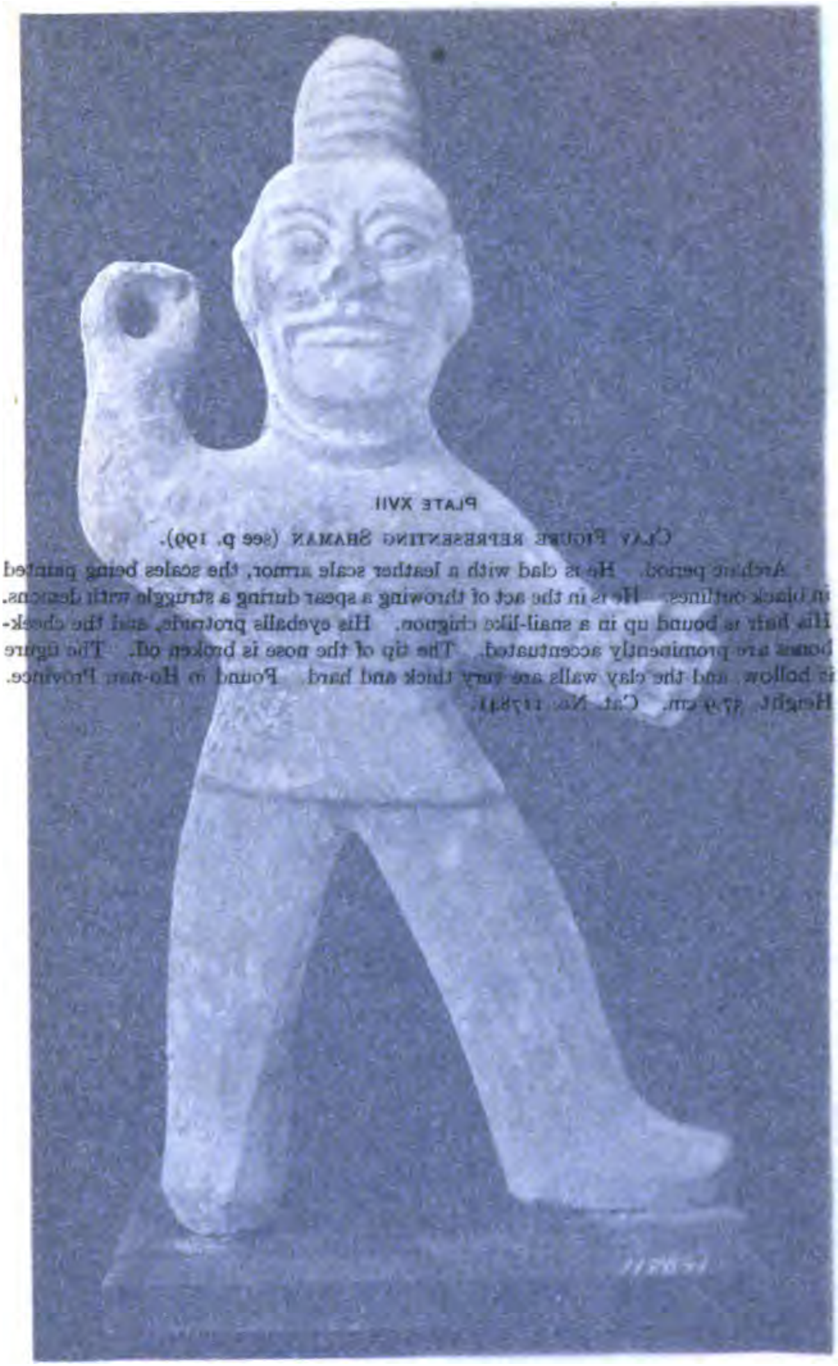
PLATE XVI.

BACK OF CLAY FIGURE SHOWN ON PLATE XV.

The scales of the cuirass are modelled in the surface of the clay. A coif of hide scales is attached to the helmet, which envelops the head on all sides.



BACK OF CLAY FIGURE ON PRECEDING PLATE.

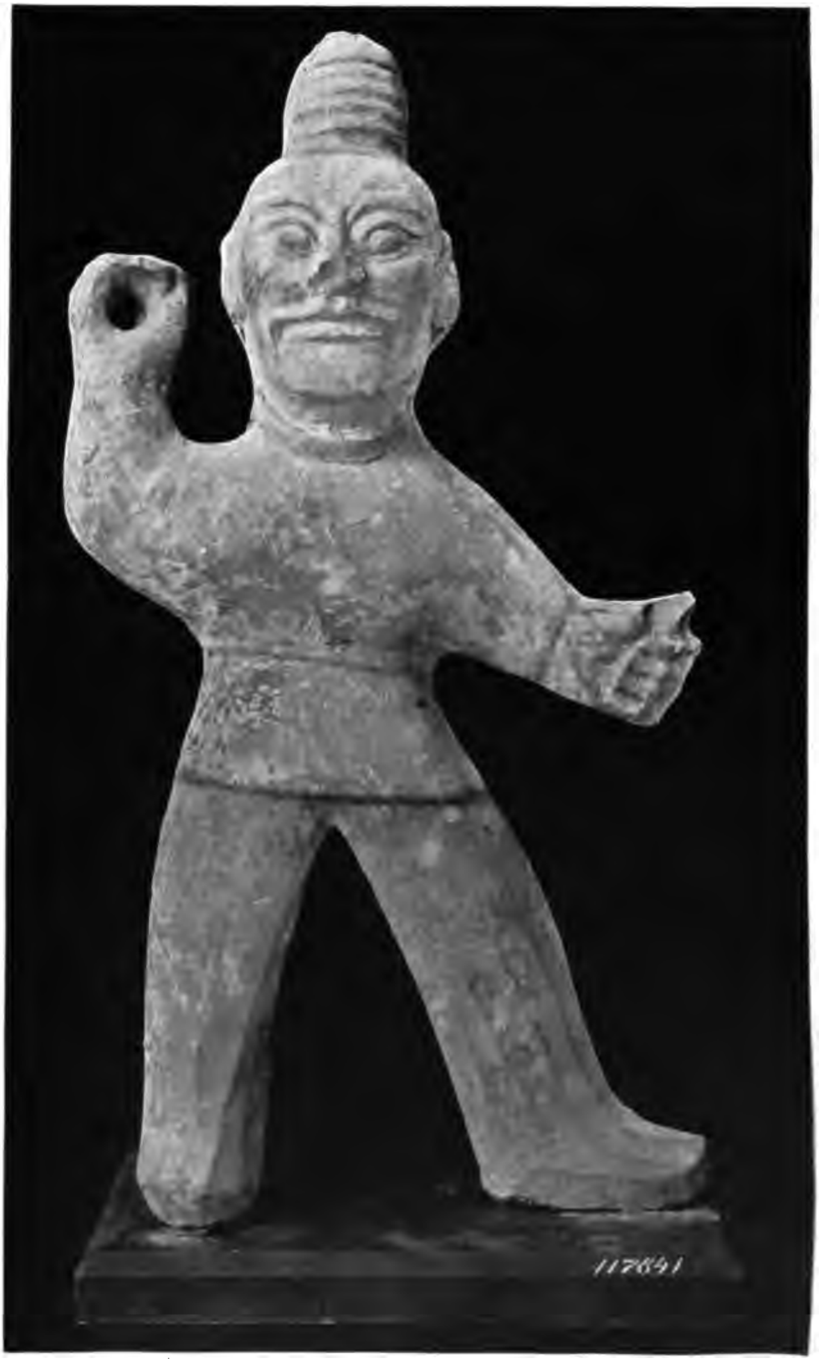


CLAY FIGURE

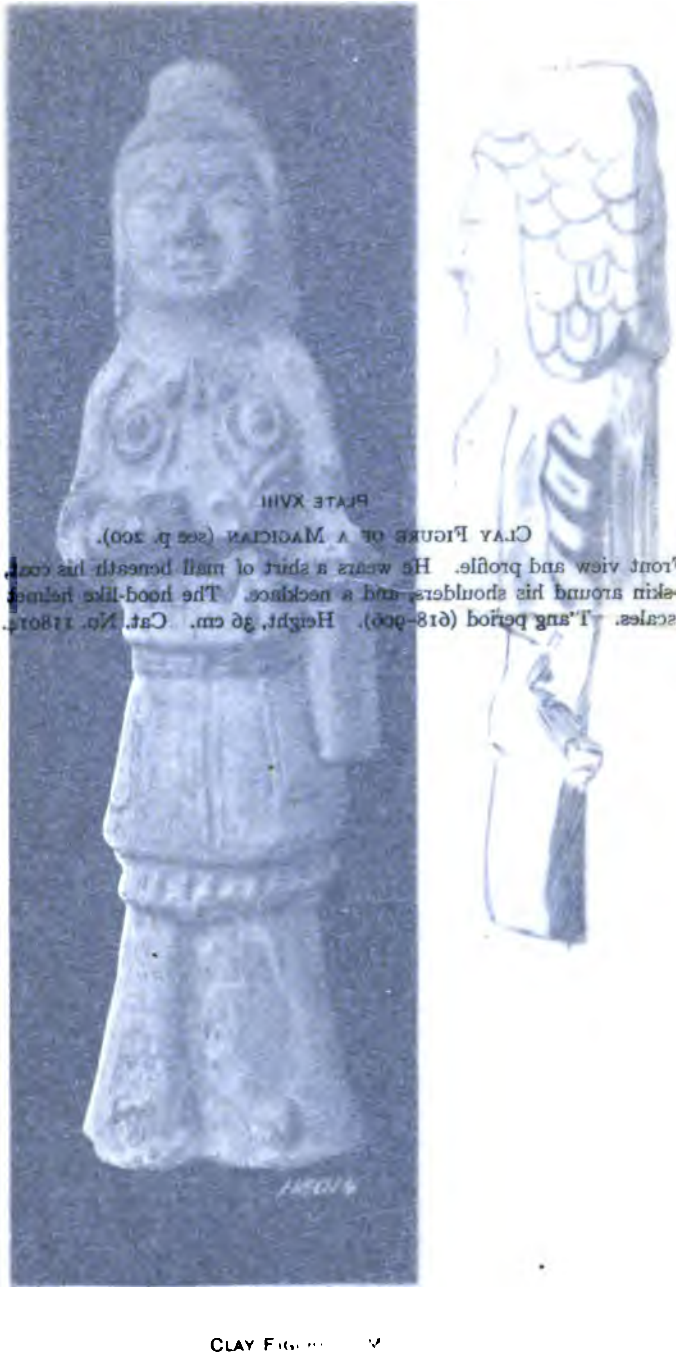
PLATE XVII.

CLAY FIGURE REPRESENTING SHAMAN (see p. 199).

Archaic period. He is clad with a leather scale armor, the scales being painted in black outlines. He is in the act of throwing a spear during a struggle with demons. His hair is bound up in a snail-like chignon. His eyeballs protrude, and the cheekbones are prominently accentuated. The tip of the nose is broken off. The figure is hollow, and the clay walls are very thick and hard. Found in Ho-nan Province. Height, 37.9 cm. Cat. No. 117841.



CLAY FIGURE REPRESENTING SHAMAN.

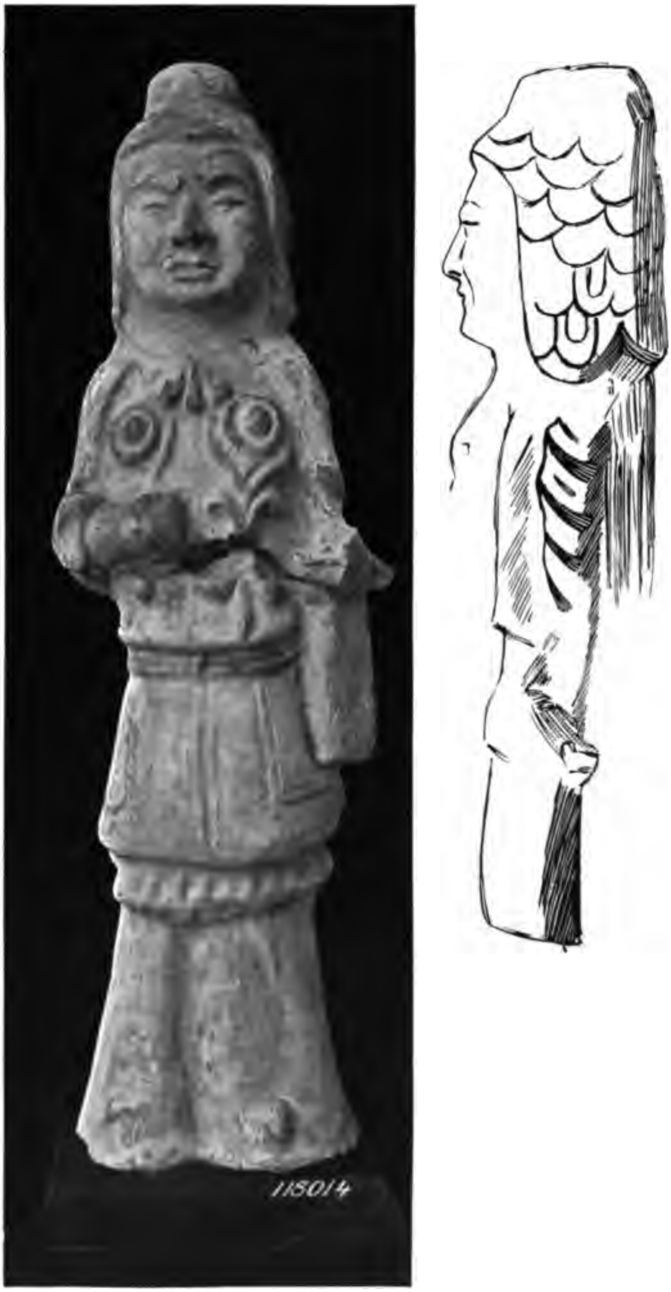


CLAY FIG

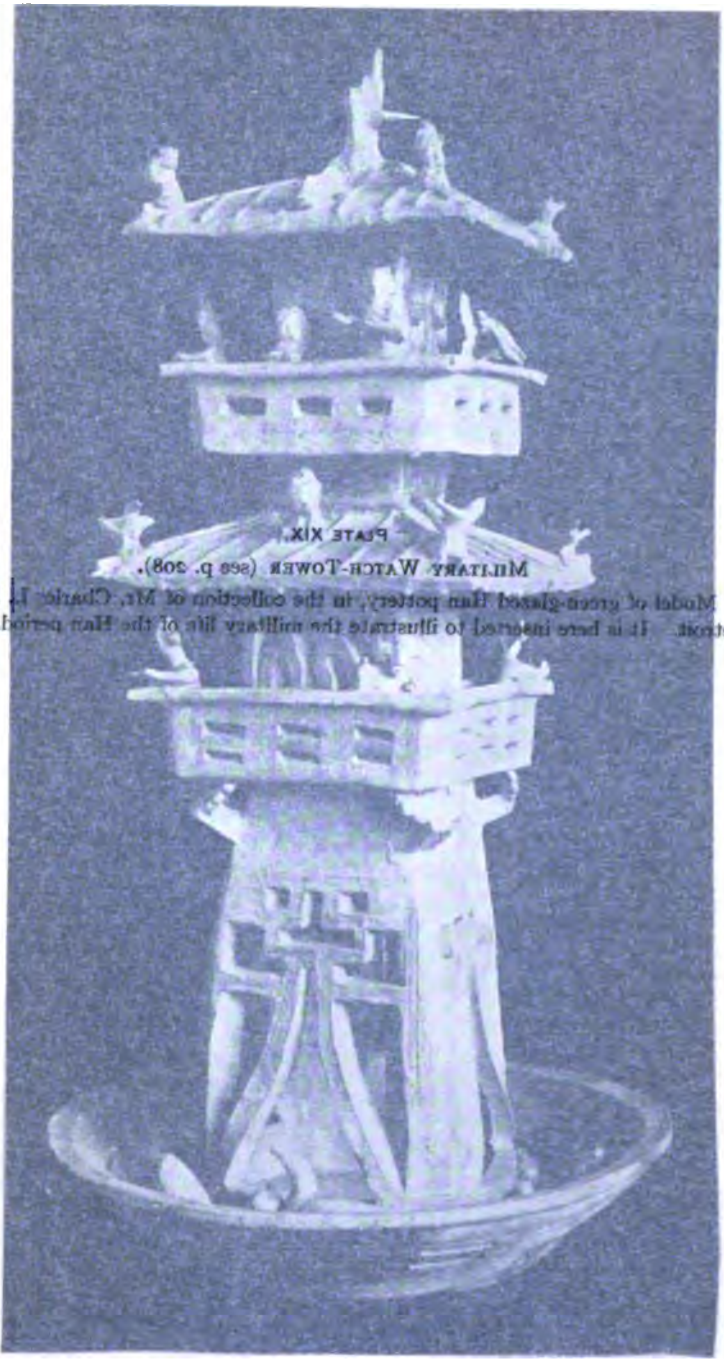
PLATE XVIII.

CLAY FIGURE OF A MAGICIAN (see p. 200).

Front view and profile. He wears a shirt of mail beneath his coat, a cape of tiger-skin around his shoulders, and a necklace. The hood-like helmet is worked into scales. T'ang period (618–906). Height, 36 cm. Cat. No. 118014.



CLAY FIGURE OF MAGICIAN.

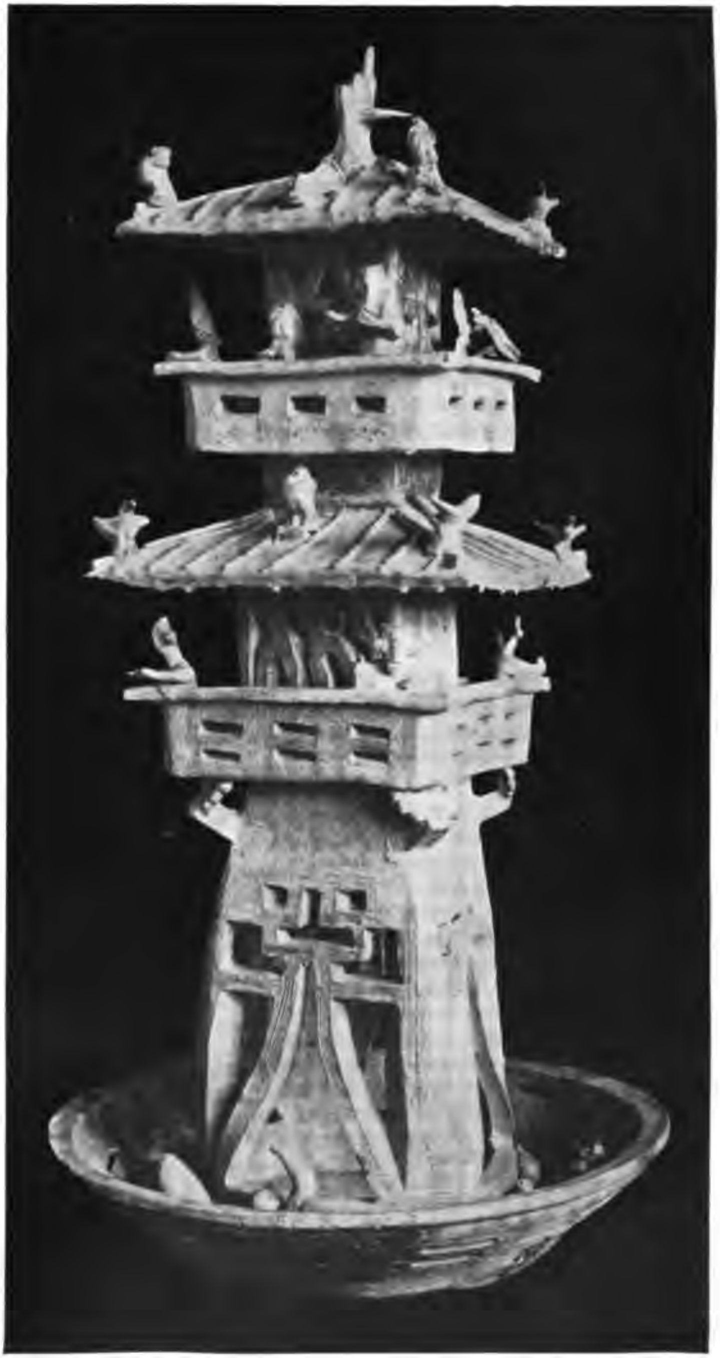


HAN POTTERY MODEL OF WATCH-TOWER.

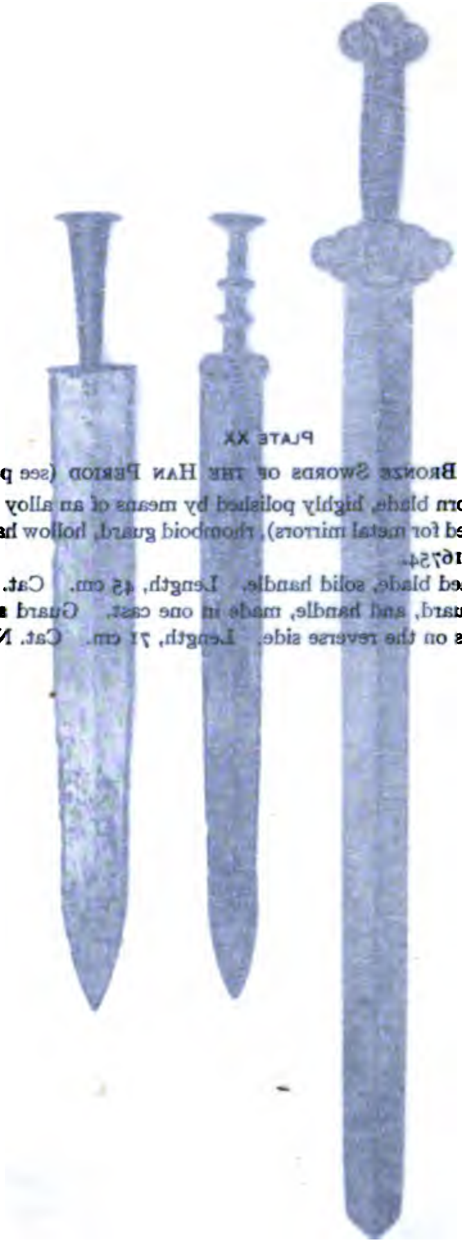
PLATE XIX.

MILITARY WATCH-TOWER (see p. 208).

Model of green-glazed Han pottery, in the collection of Mr. Charles L. Freer of Detroit. It is here inserted to illustrate the military life of the Han period.



HAN POTTERY MODEL OF WATCH-TOWER.



BRONZE SWORDS OF THE HAN PERIOD

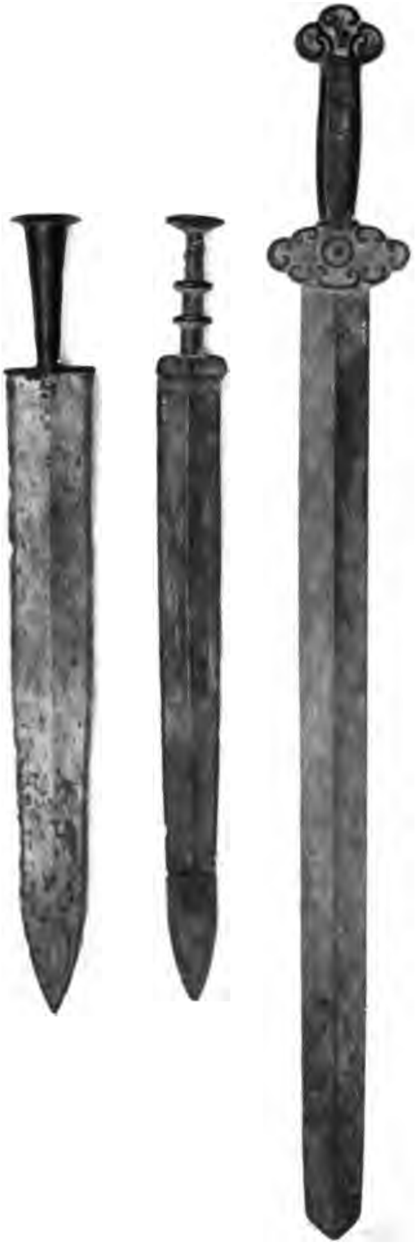
PLATE XX.

TWO-EDGED BRONZE SWORDS OF THE HAN PERIOD (see p. 215).

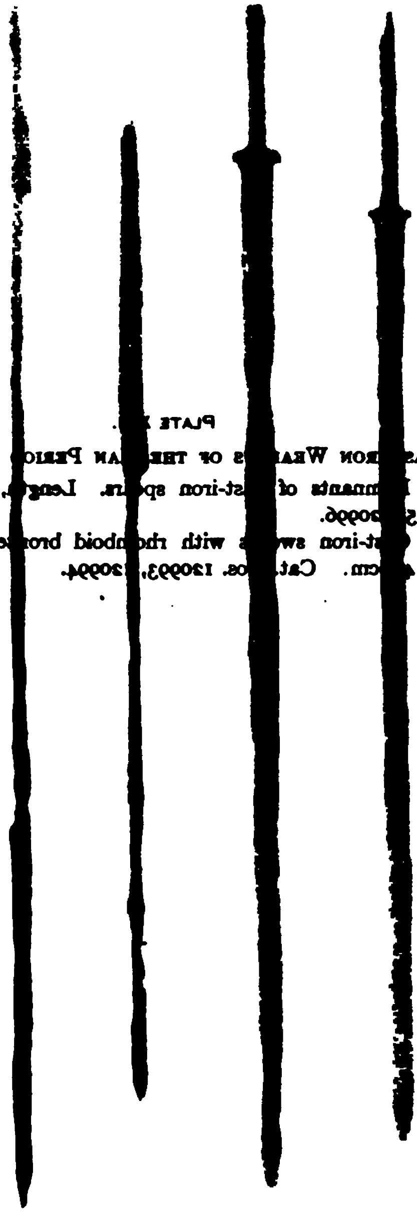
Fig. 1. Much-worn blade, highly polished by means of an alloy of mercury and tin (such as is employed for metal mirrors), rhomboid guard, hollow handle. Length 45.6 cm. Cat. No. 116754.

Fig. 2. Unpolished blade, solid handle. Length, 45 cm. Cat. No. 116757.

Fig. 3. Blade, guard, and handle, made in one cast. Guard and knob of hilt show the same designs on the reverse side. Length, 71 cm. Cat. No. 116756.



BRONZE SWORDS OF THE HAN PERIOD.



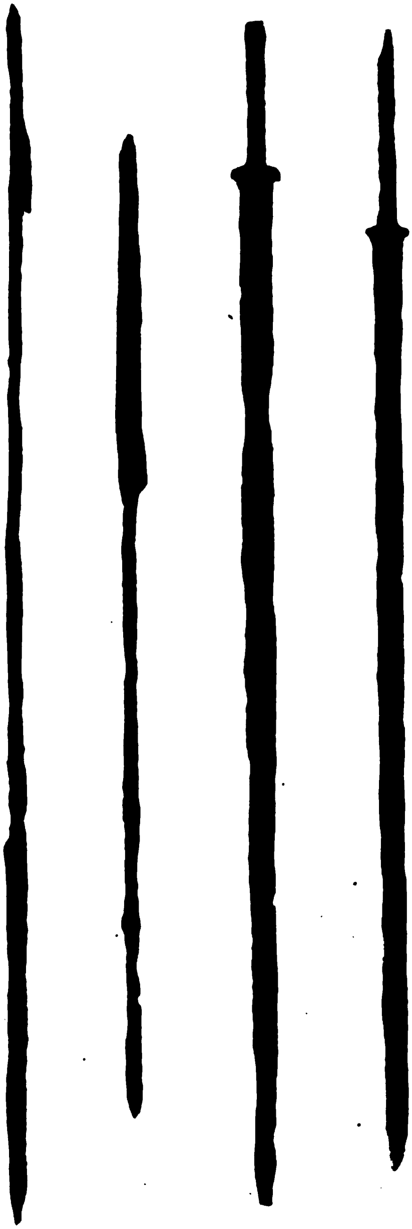
CAST-IRON WEAPONS

PLATE XXI.

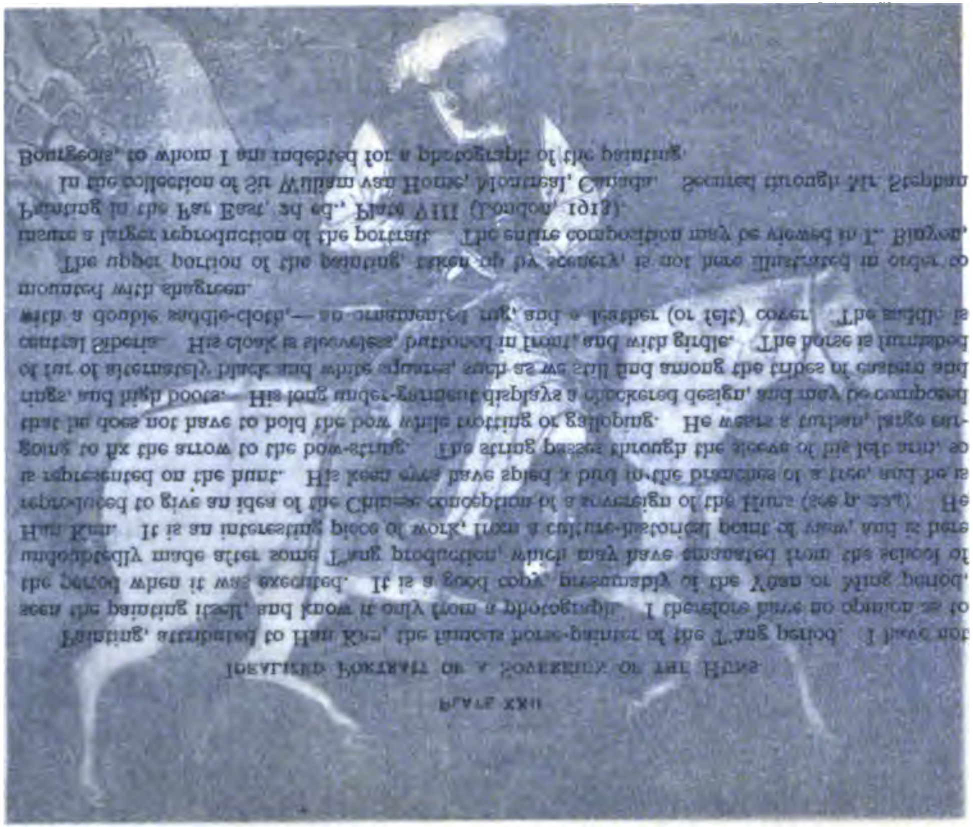
CAST-IRON WEAPONS OF THE HAN PERIOD (see p. 216).

Figs. 1–2. Remnants of cast-iron spears. Length, 122.8 cm and 99 cm. Cat. Nos. 120995, 120996.

Figs. 3–4. Cast-iron swords with rhomboid bronze sword-guards. Length, 117.6 cm and 114.3 cm. Cat. Nos. 120993, 120994.



CAST-IRON WEAPONS OF THE HAN PERIOD.



A SOVEREIGN OF THE HUNS

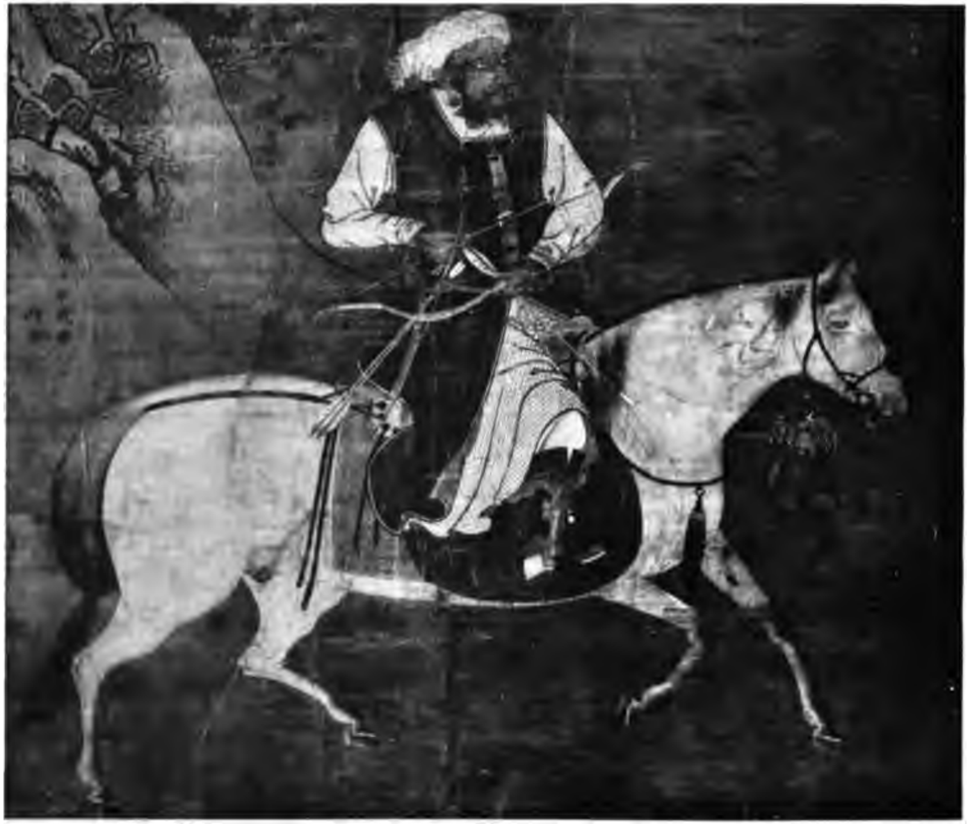
PLATE XXII.

IDEALIZED PORTRAIT OF A SOVEREIGN OF THE HUNS.

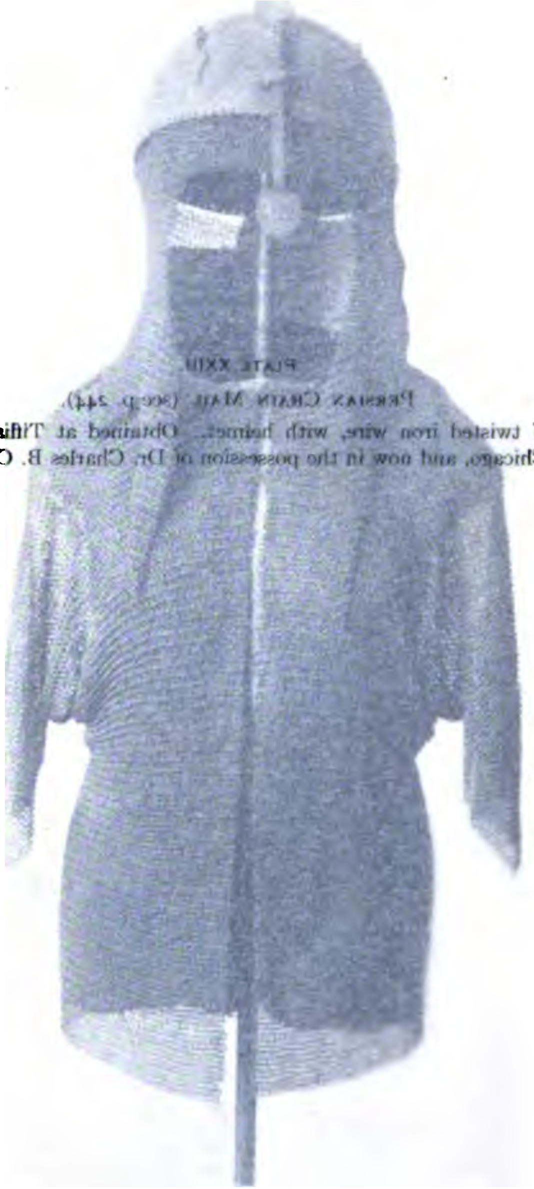
Painting, attributed to Han Kan, the famous horse-painter of the T'ang period. I have not seen the painting itself, and know it only from a photograph. I therefore have no opinion as to the period when it was executed. It is a good copy, presumably of the Yüan or Ming period, undoubtedly made after some T'ang production, which may have emanated from the school of Han Kan. It is an interesting piece of work, from a culture-historical point of view, and is here reproduced to give an idea of the Chinese conception of a sovereign of the Huns (see p. 224). He is represented on the hunt. His keen eyes have spied a bird in the branches of a tree, and he is going to fix the arrow to the bow-string. The string passes through the sleeve of his left arm, so that he does not have to hold the bow while trotting or galloping. He wears a turban, large ear-rings, and high boots. His long under-garment displays a checkered design, and may be composed of fur of alternately black and white squares, such as we still find among the tribes of eastern and central Siberia. His cloak is sleeveless, buttoned in front, and with girdle. The horse is furnished with a double saddle-cloth,— an ornamented rug, and a leather (or felt) cover. The saddle is mounted with shagreen.

The upper portion of the painting, taken up by scenery, is not here illustrated in order to insure a larger reproduction of the portrait. The entire composition may be viewed in L. Binyon, Painting in the Far East, 2d ed., Plate VIII (London, 1913).

In the collection of Sir William van Horne, Montreal, Canada. Secured through Mr. Stephan Bourgeois, to whom I am indebted for a photograph of the painting.



A SOVEREIGN OF THE HUNS.

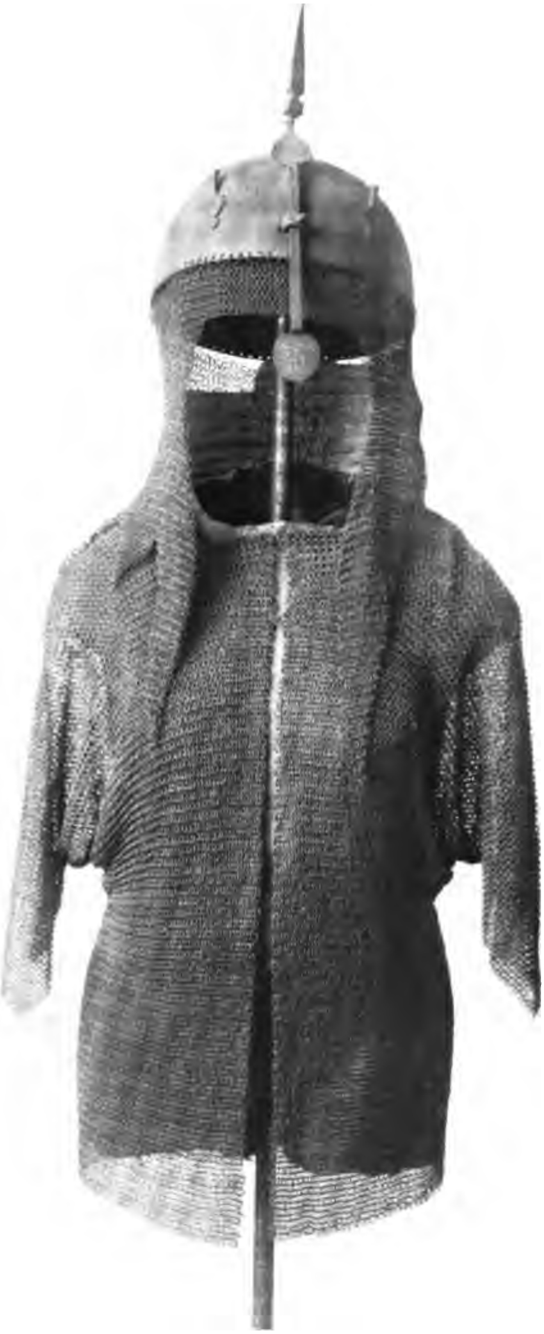


PERSIAN CHAIN MAIL, FRONT VIEW

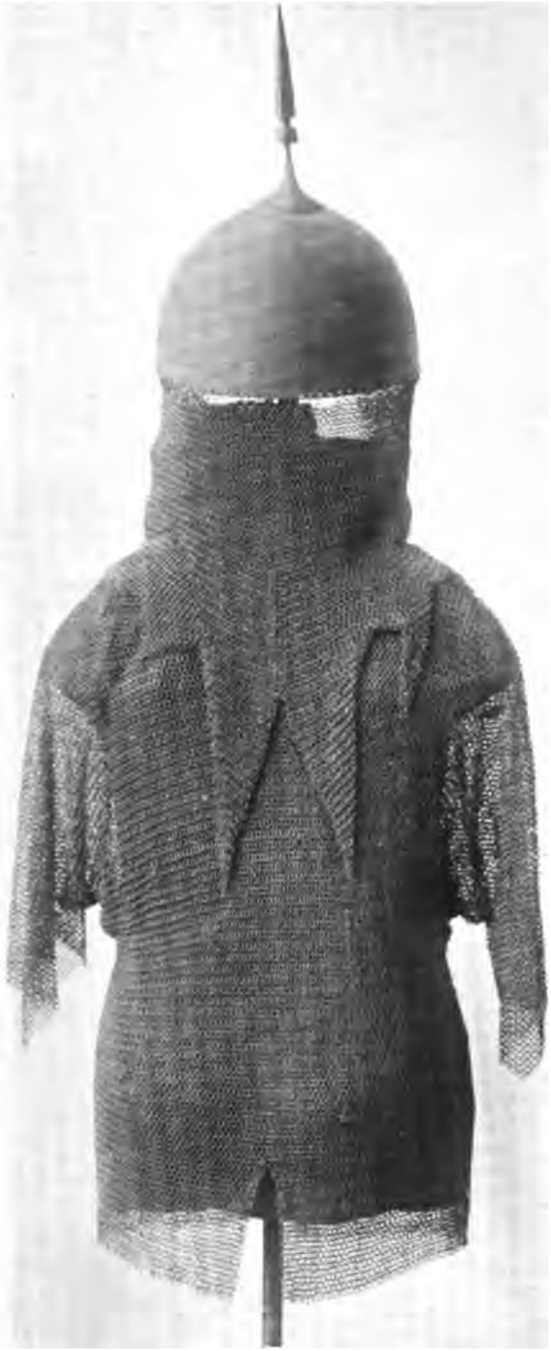
PLATE XXIII.

PERSIAN CHAIN MAIL (see p. 244).

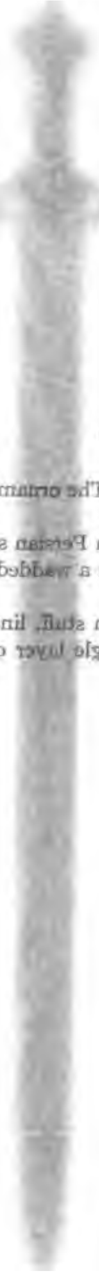
Made of twisted iron wire, with helmet. Obtained at Tiflis by Mr. Charles R. Crane, Chicago, and now in the possession of Dr. Charles B. Cory, Chicago.

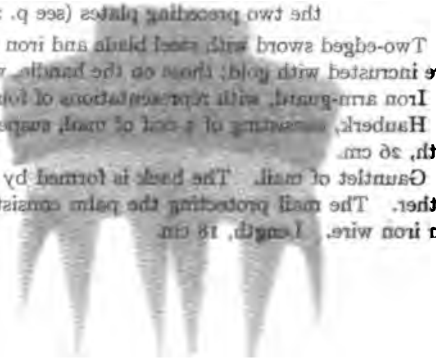


PERSIAN CHAIN MAIL, FRONT VIEW.



PERSIAN CHAIN MAIL, BACK VIEW.





MAIL

PLATE XXV.

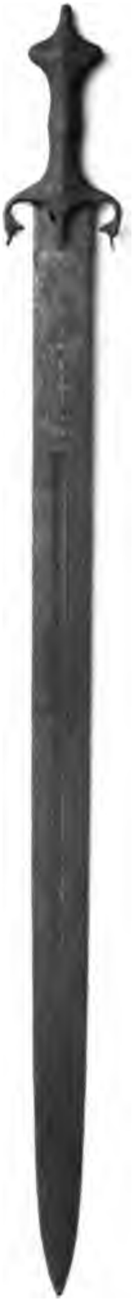
Outfit belonging to Persian Chain Mail shown on
the two preceding plates (see p. 244).

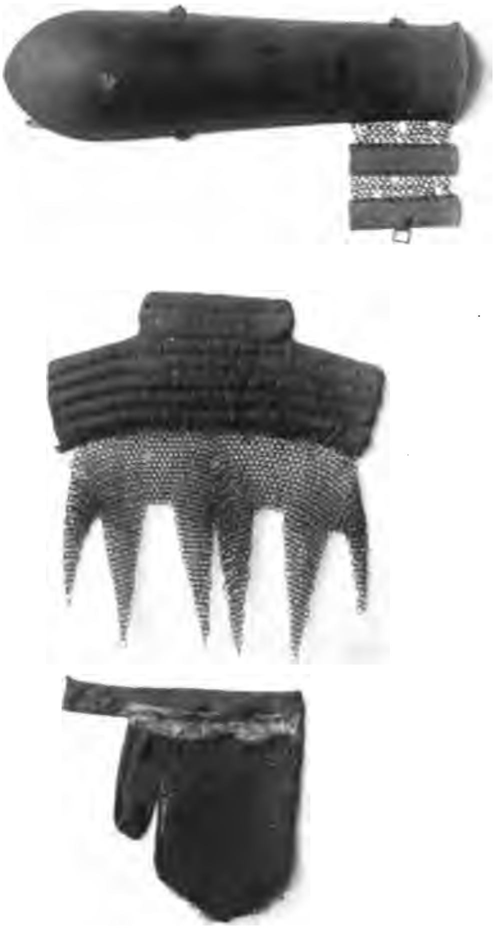
Fig. 1. Two-edged sword with steel blade and iron handle. The ornaments on the blade are incrusted with gold; those on the handle, with silver.

Fig. 2. Iron arm-guard, with representations of four scenes in Persian style.

Fig. 3. Hauberk, consisting of a coif of mail, suspended from a wadded cotton quilt. Width, 26 cm.

Fig. 4. Gauntlet of mail. The back is formed by red cotton stuff, lined with chamois leather. The mail protecting the palm consists of a single layer of chain twisted from iron wire. Length, 18 cm.





1 2-4

OUTFIT BELONGING TO PERSIAN CHAIN MAIL

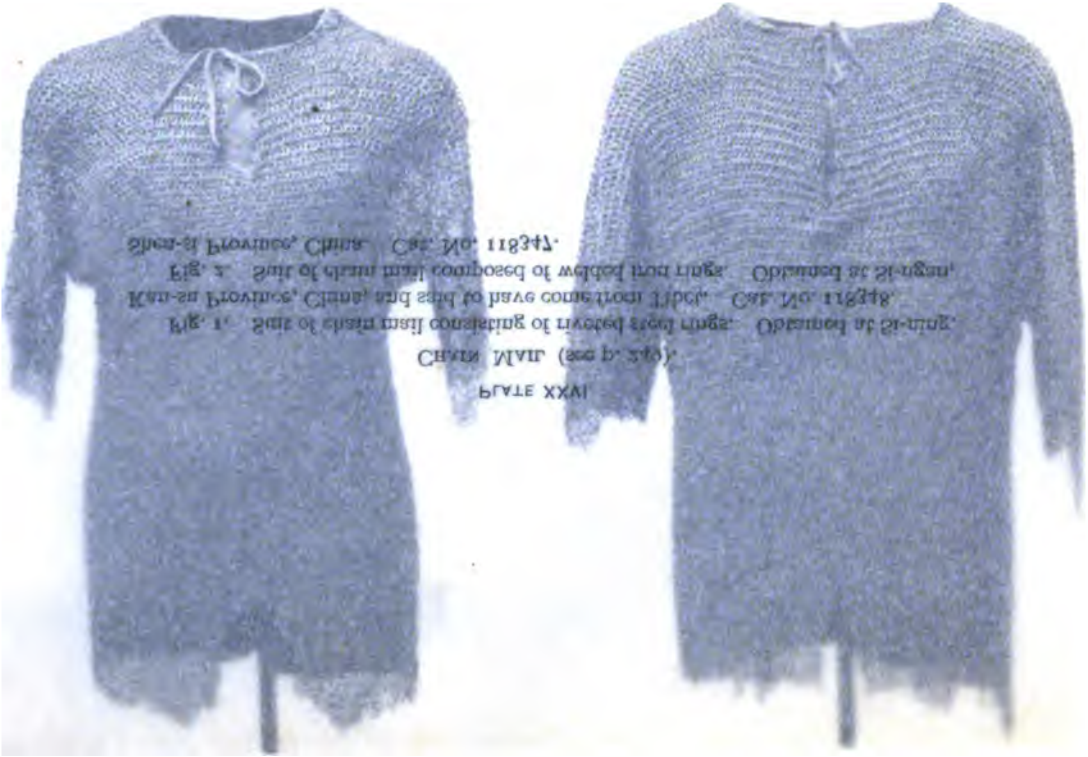
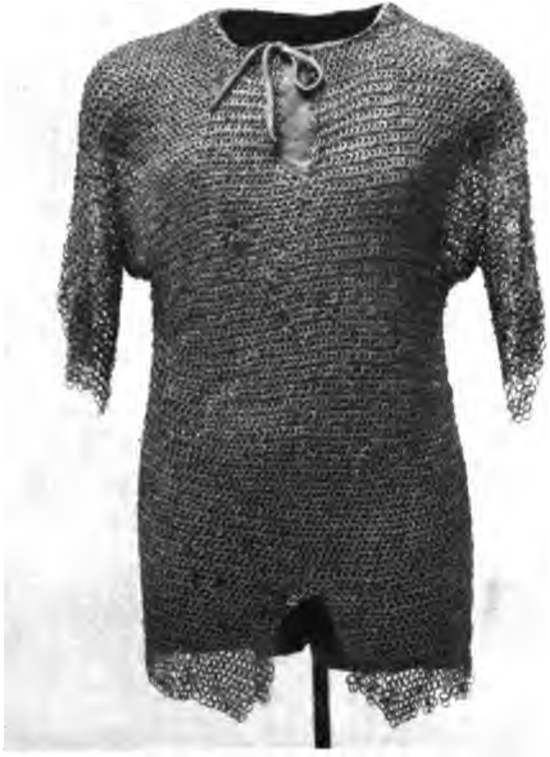


PLATE XXVI.

CHAIN MAIL (see p. 249).

Fig. 1. Suit of chain mail consisting of riveted steel rings. Obtained at Si-ning, Kan-su Province, China, and said to have come from Tibet. Cat. No. 118348.

Fig. 2. Suit of chain mail composed of welded iron rings. Obtained at Si-ngan, Shen-si Province, China. Cat. No. 118347.



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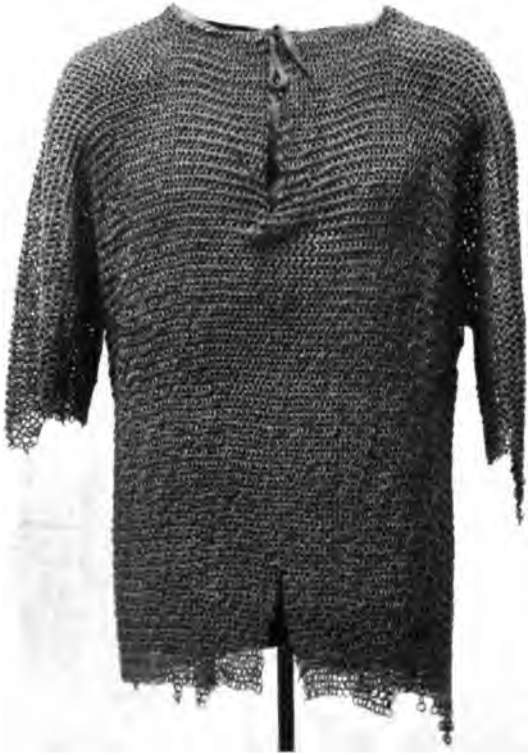
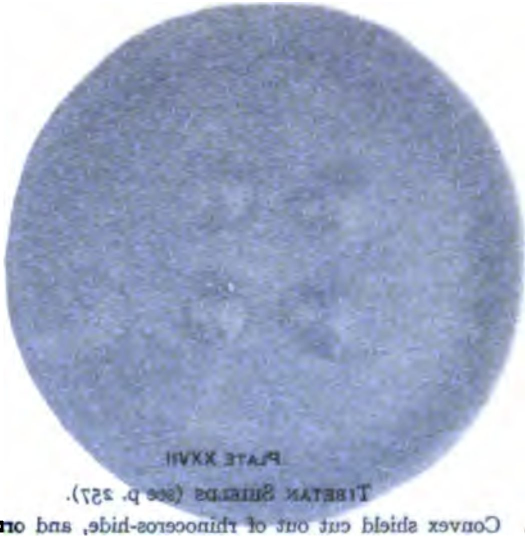
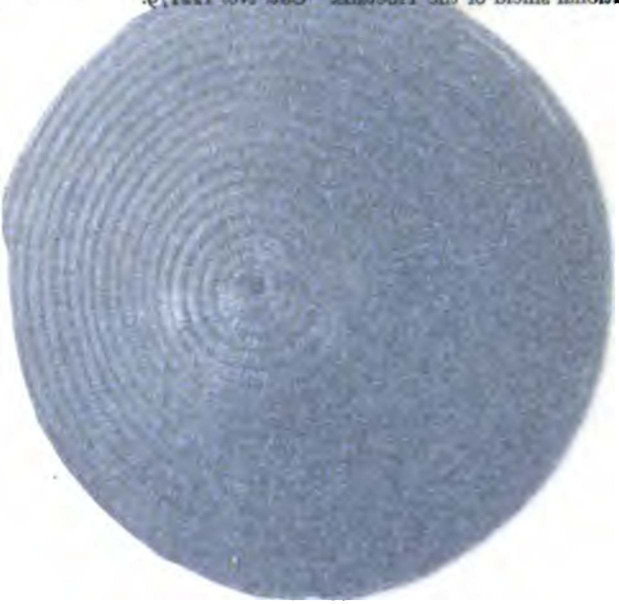


2

CHAIN MAIL FROM SI-NING AND SI-NGAN.





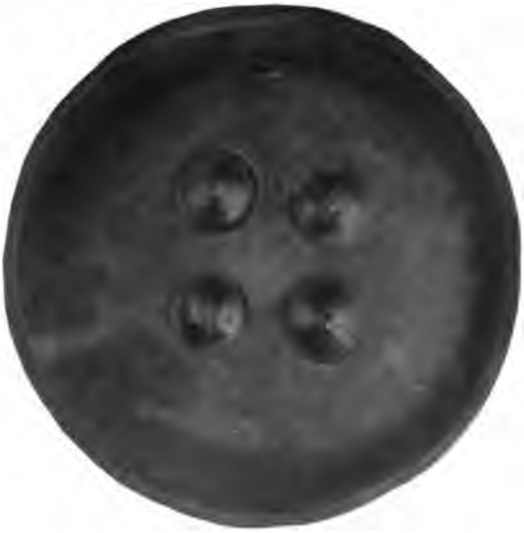
TIBETAN

PLATE XXVII.

TIBETAN SHIELDS (see p. 257).

Fig. 1. Convex shield cut out of rhinoceros-hide, and ornamented with four brass bosses. Shields of this kind were manufactured in India and imported into Tibet. Cat. No. 122178.

Fig. 2. Shield of rattan, plaited in the basketry style of circular coils. This is the national shield of the Tibetans. Cat. No. 122179.



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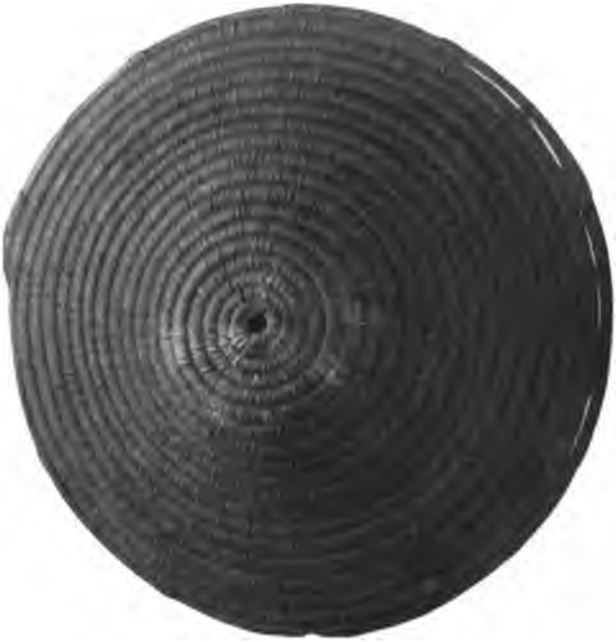
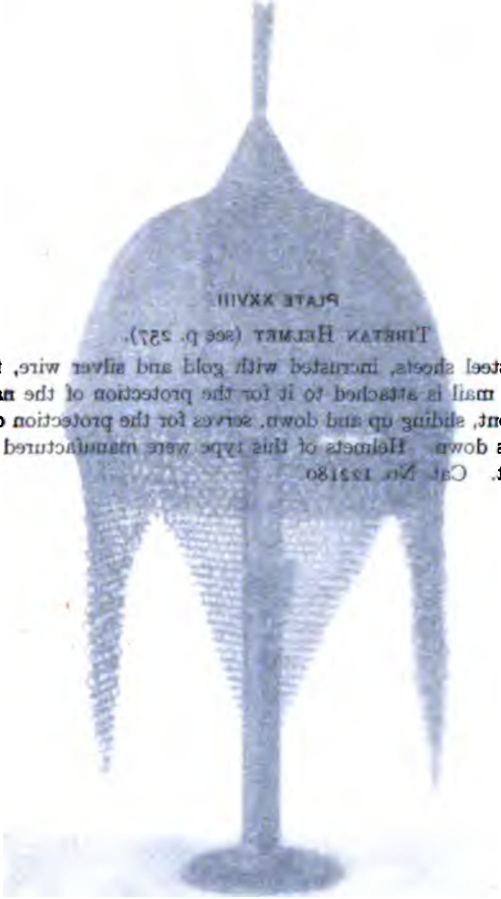


2

TIBETAN SHIELDS.

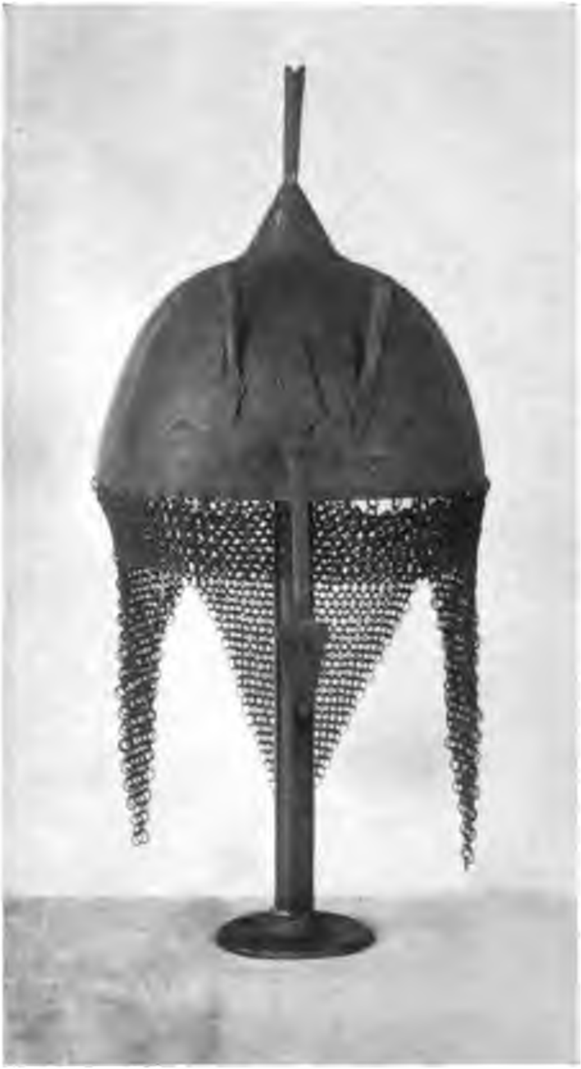


[illegible]

PLATE XXVIII.

TIBETAN HELMET (see p. 257).

Composed of steel sheets, incrusted with gold and silver wire, forming floral designs. A coif of mail is attached to it for the protection of the nape. A nose-guard (nasal) in front, sliding up and down, serves for the protection of the nose; in the illustration it is down. Helmets of this type were manufactured in India and imported into Tibet. Cat. No. 122180.



TIBETAN HELMET OF INDO-PERSIAN STYLE.

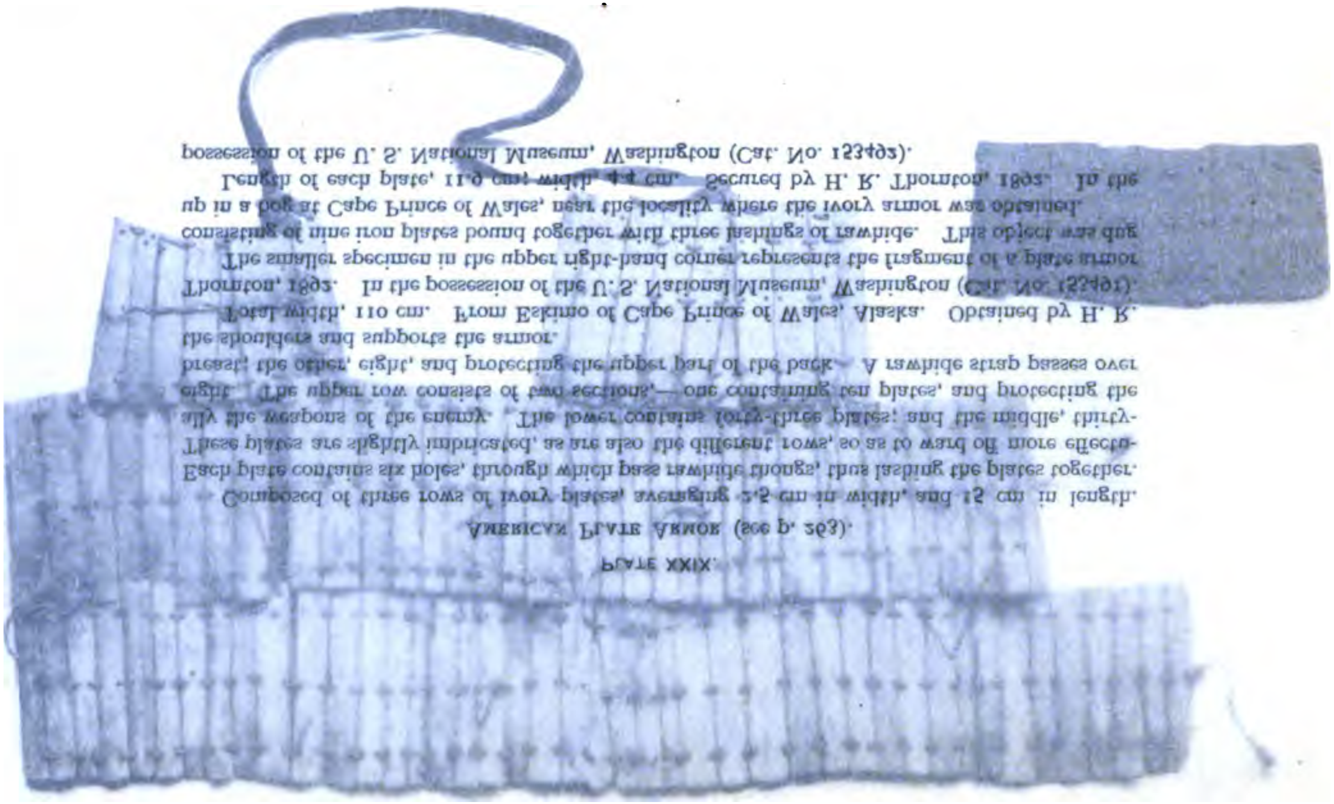


PLATE XXIX.

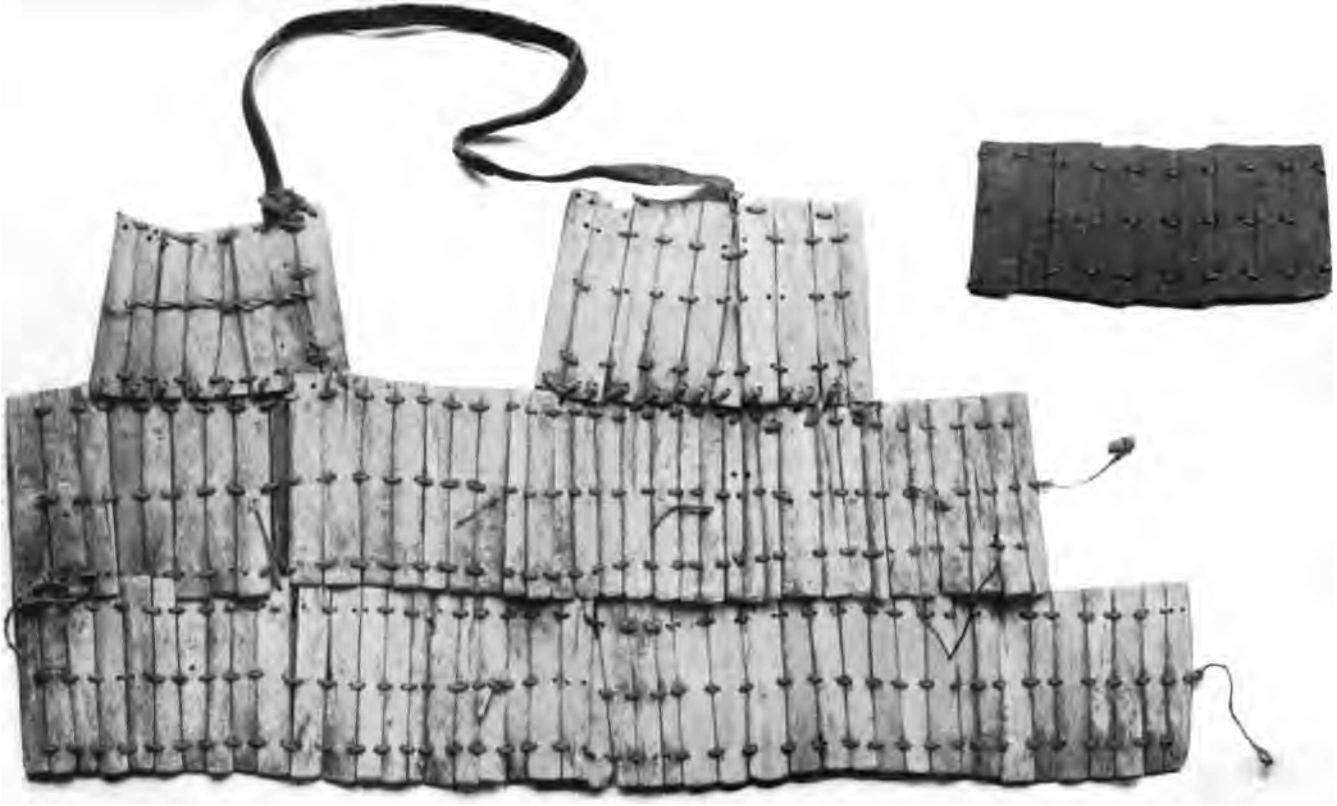
AMERICAN PLATE ARMOR (see p. 263).

Composed of three rows of ivory plates, averaging 2.5 cm in width, and 15 cm in length. Each plate contains six holes, through which pass rawhide thongs, thus lashing the plates together. These plates are slightly imbricated, as are also the different rows, so as to ward off more effectually the weapons of the enemy. The lower contains forty-three plates; and the middle, thirty-eight. The upper row consists of two sections,— one containing ten plates, and protecting the breast; the other, eight, and protecting the upper part of the back. A rawhide strap passes over the shoulders and supports the armor.

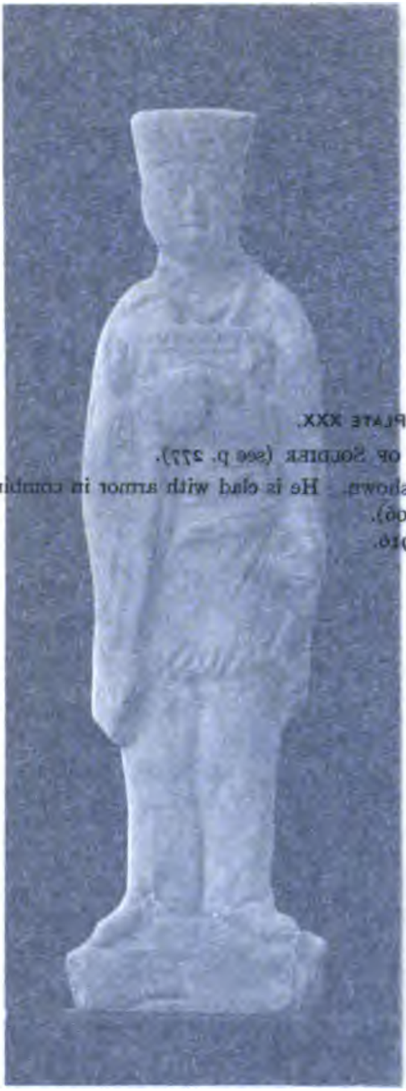
Total width, 110 cm. From Eskimo of Cape Prince of Wales, Alaska. Obtained by H. R. Thornton, 1892. In the possession of the U. S. National Museum, Washington (Cat. No. 153491).

The smaller specimen in the upper right-hand corner represents the fragment of a plate armor consisting of nine iron plates bound together with three lashings of rawhide. This object was dug up in a bog at Cape Prince of Wales, near the locality where the ivory armor was obtained.

Length of each plate, 11.9 cm; width, 4.4 cm. Secured by H. R. Thornton, 1892. In the possession of the U. S. National Museum, Washington (Cat. No. 153492).



ESKIMO ARMOR OF IVORY PLATES AND FRAGMENT OF IRON PLATES.



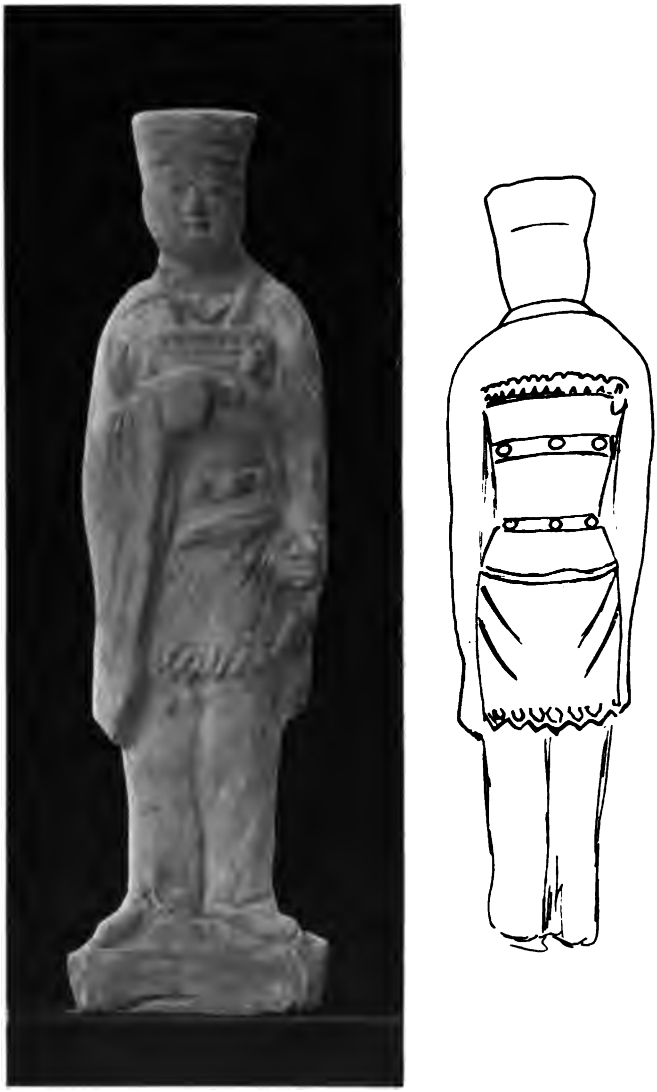
CLAY FIGURE OF SOLDIER. FRONT VIEW.

PLATE XXX.

CLAY FIGURE OF SOLDIER (see p. 277).

Both front and back views are shown. He is clad with armor in combination with costume. T'ang period (618-906).

Height, 20.5 cm. Cat. No. 117916.



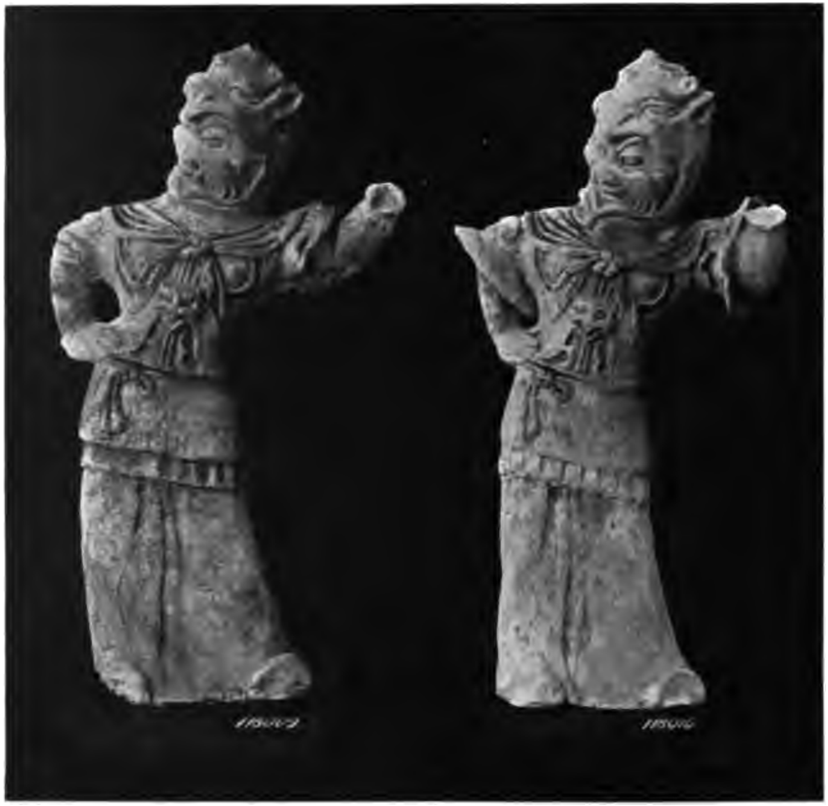
CLAY FIGURE OF SOLDIER, FRONT AND BACK VIEWS.

PLATE XXXI.

PAIR OF ARMORED KNIGHTS (see p. 277).

Clay figures of the T'ang period (618–906), from Shen-si Province. They are clad with sheet armor, — a clasp in the shape of an animal-head holding the plastron together,— and with apron consisting of metal plates (compare Fig. 42). The helmet-mask is formed by the head of an eagle. Compare the peculiar pose of these figures with that of the figures on Plates XLIX, LIII (Fig. 2), LIV, and LV.

Height, 34.3 cm. Cat. Nos. 118009, 118010.



CLAY FIGURES OF ARMORED GUARDIANS OF THE GRAVE.

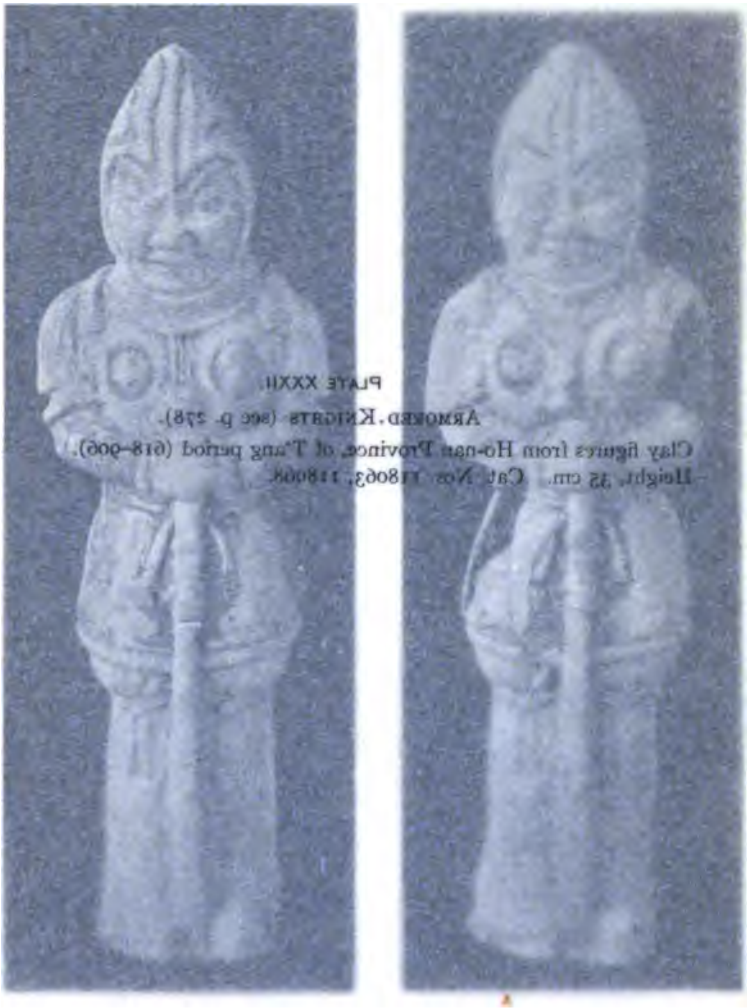
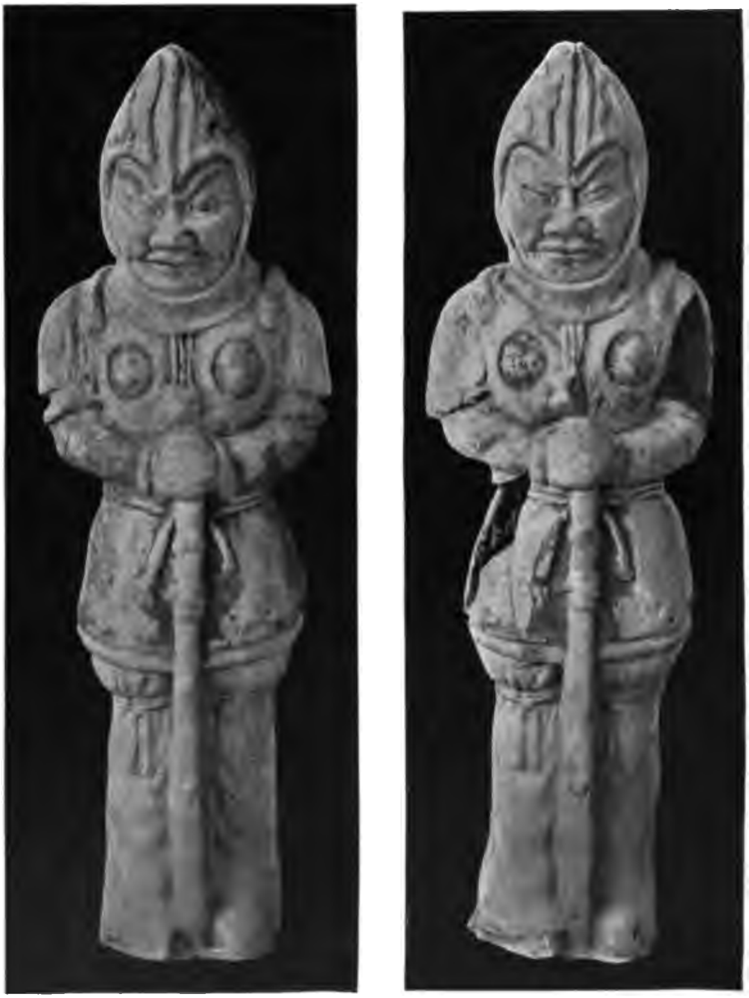


PLATE XXXII.

ARMORED KNIGHTS (see p. 278).

Clay figures from Ho-nan Province, of T'ang period (618–906).
Height, 35 cm. Cat. Nos. 118063, 118068.



CLAY FIGURES OF ARMORED GUARDIANS OF THE GRAVE.

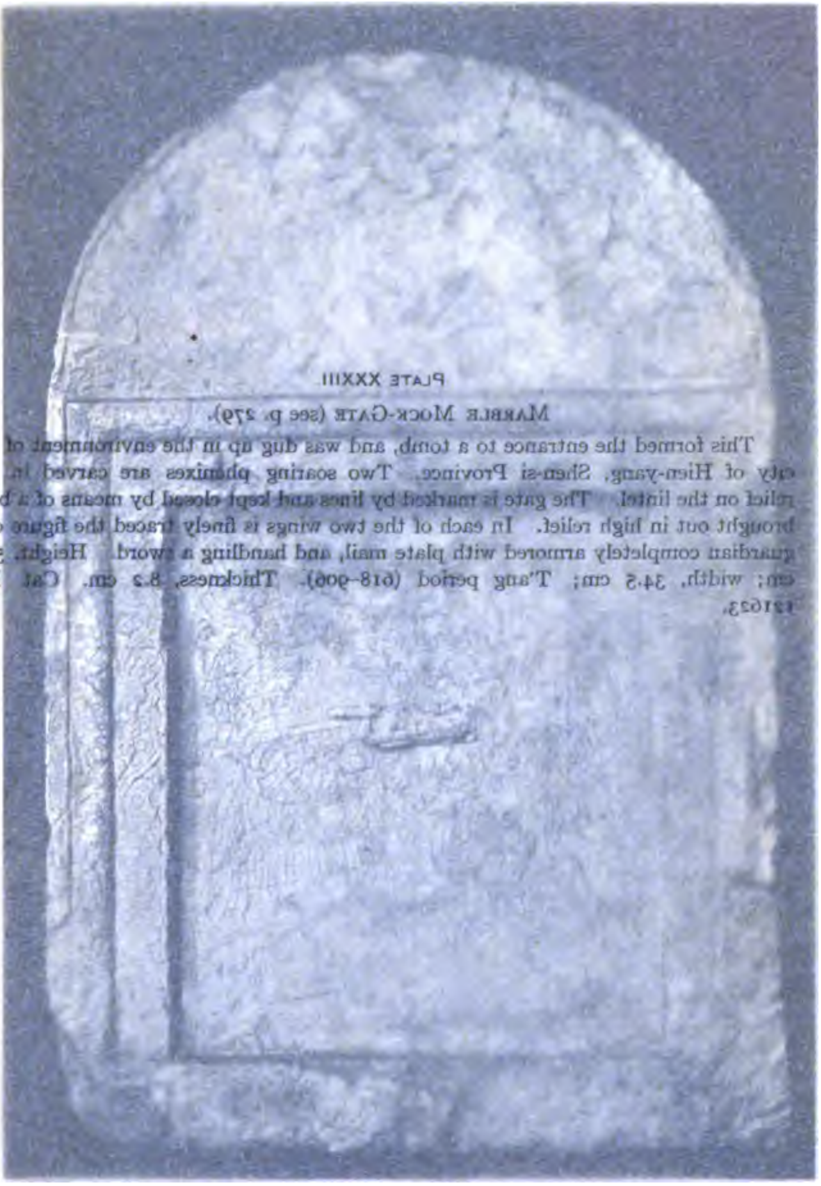
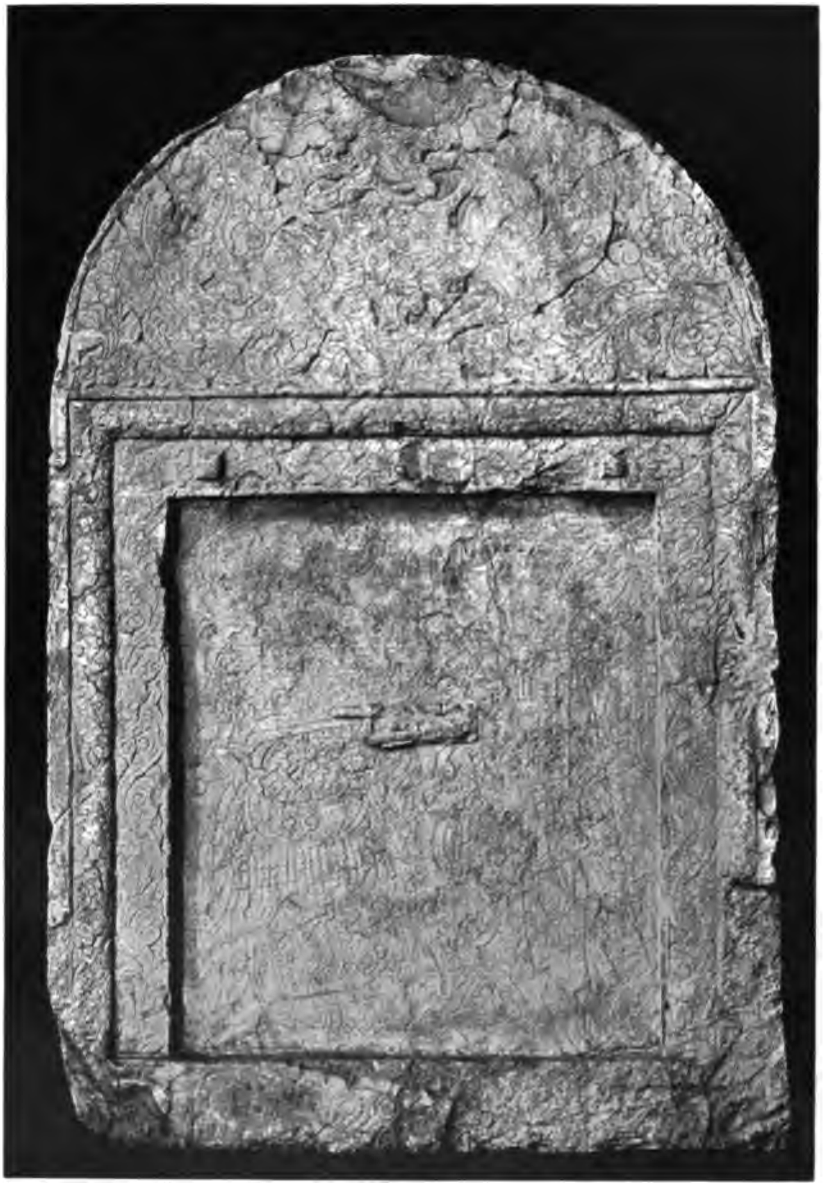


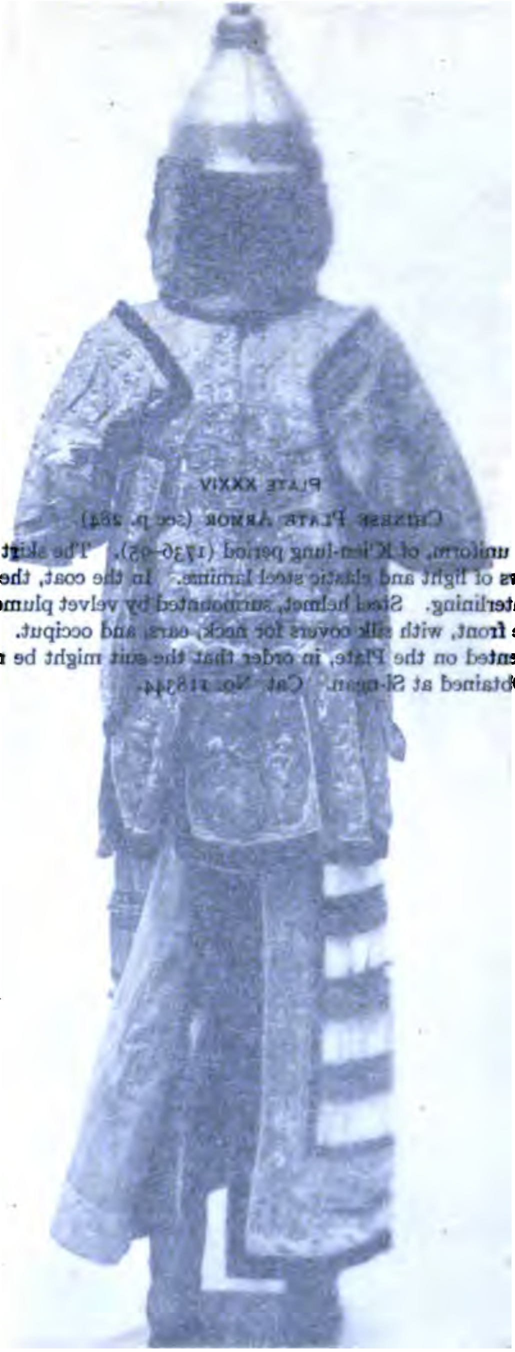
PLATE XXXIII.

MARBLE MOCK-GATE (see p. 279).

This formed the entrance to a tomb, and was dug up in the environment of the city of Hien-yang, Shen-si Province. Two soaring phenixes are carved in flat relief on the lintel. The gate is marked by lines and kept closed by means of a bolt, brought out in high relief. In each of the two wings is finely traced the figure of a guardian completely armored with plate mail, and handling a sword. Height, 52.5 cm; width, 34.5 cm; T'ang period (618–906). Thickness, 8.2 cm. Cat. No. 121623.



Marble Mock-Gate of a Tomb.

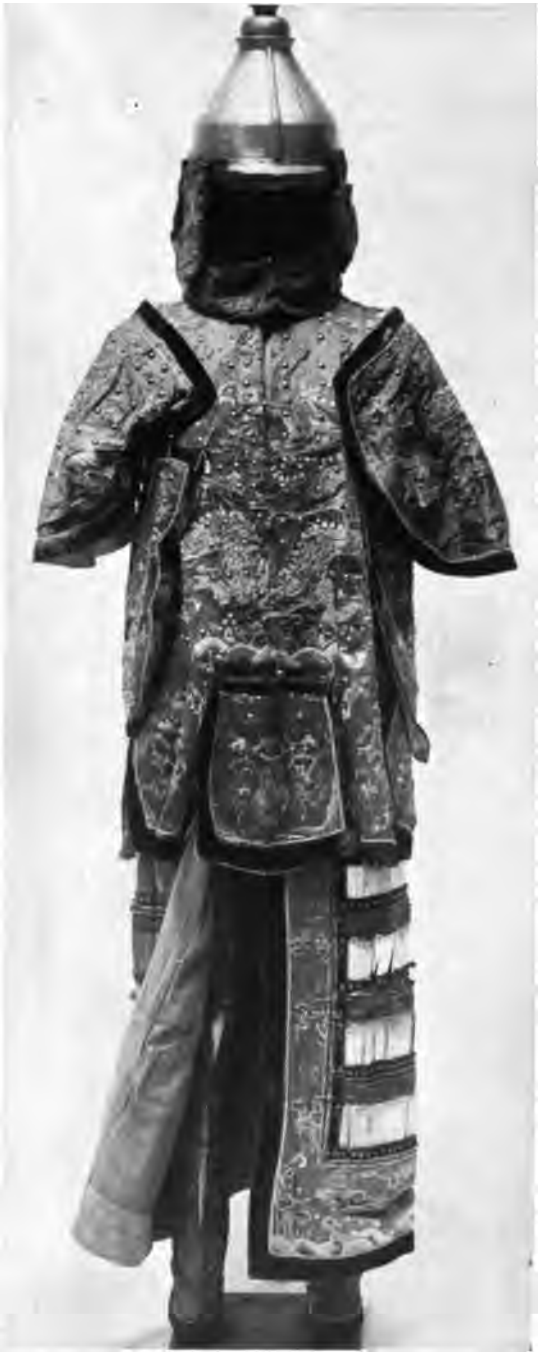


HORSEMAN'S SUIT OF ARMOR

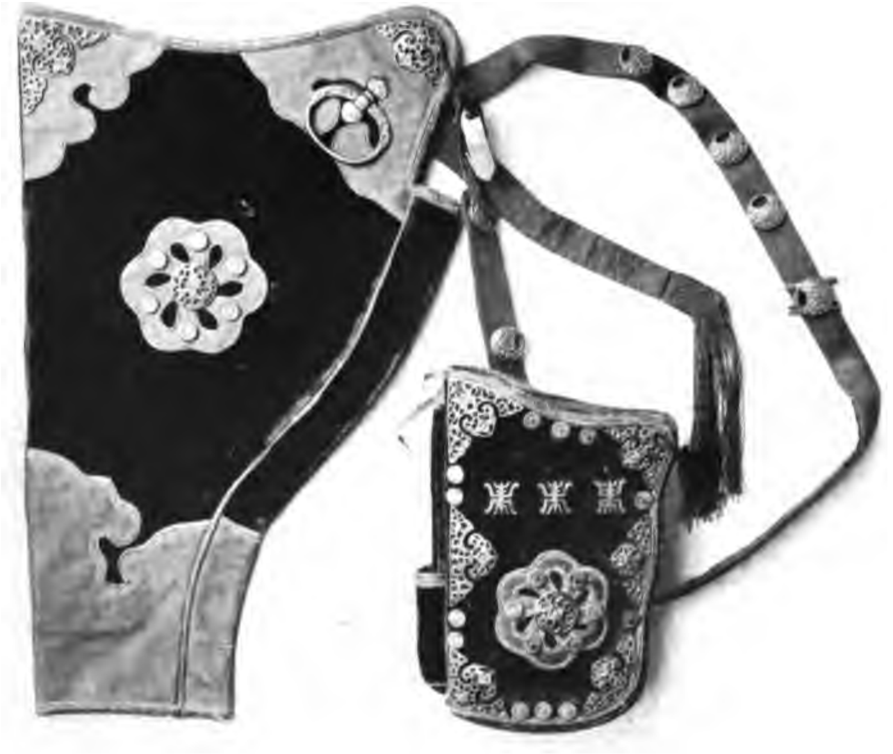
PLATE XXXIV.

CHINESE PLATE ARMOR (see p. 284).

Horseman's uniform, of K'ien-lung period (1736–95). The skirt is covered with four parallel rows of light and elastic steel laminæ. In the coat, the steel plates are inserted as an interlining. Steel helmet, surmounted by velvet plume, dragons being engraved on the front, with silk covers for neck, ears, and occiput. The plume has not been represented on the Plate, in order that the suit might be reproduced on a larger scale. Obtained at Si-ngan. Cat. No. 118344.



HORSEMAN'S SUIT OF ARMOR.



BOW-CASE AND QUIVER OF PALACE OFFICER.

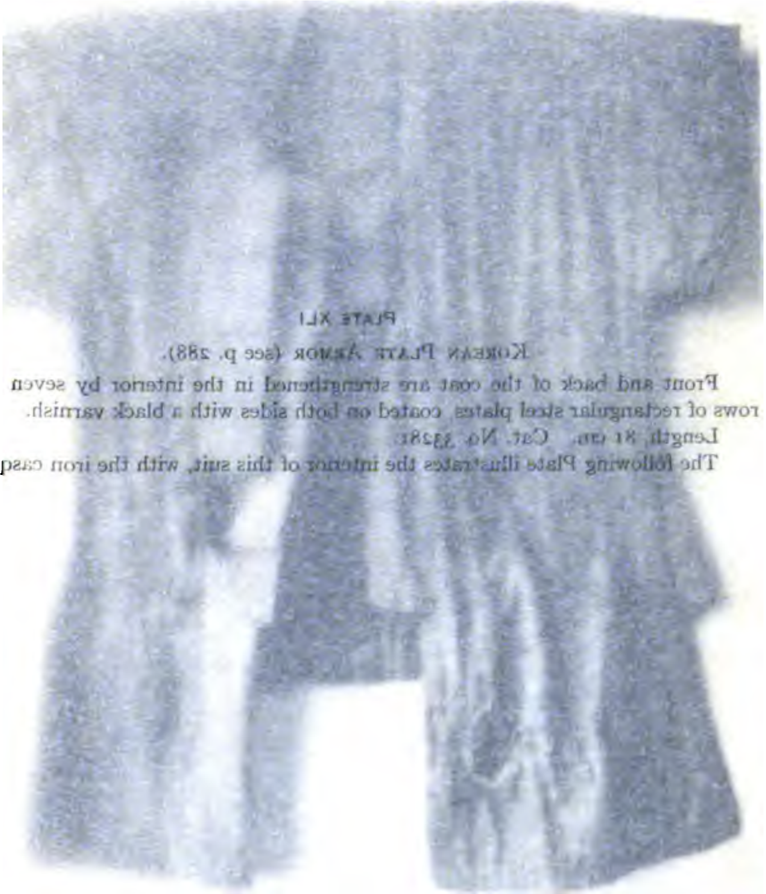


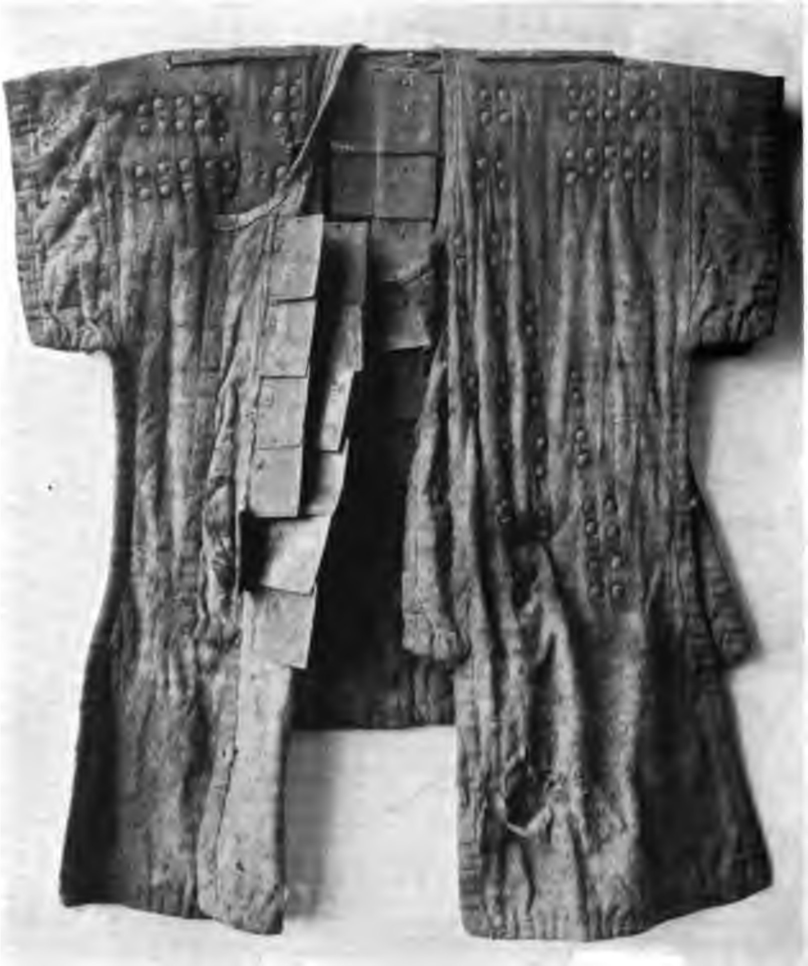
PLATE XLI.

KOREAN PLATE ARMOR (see p. 288).

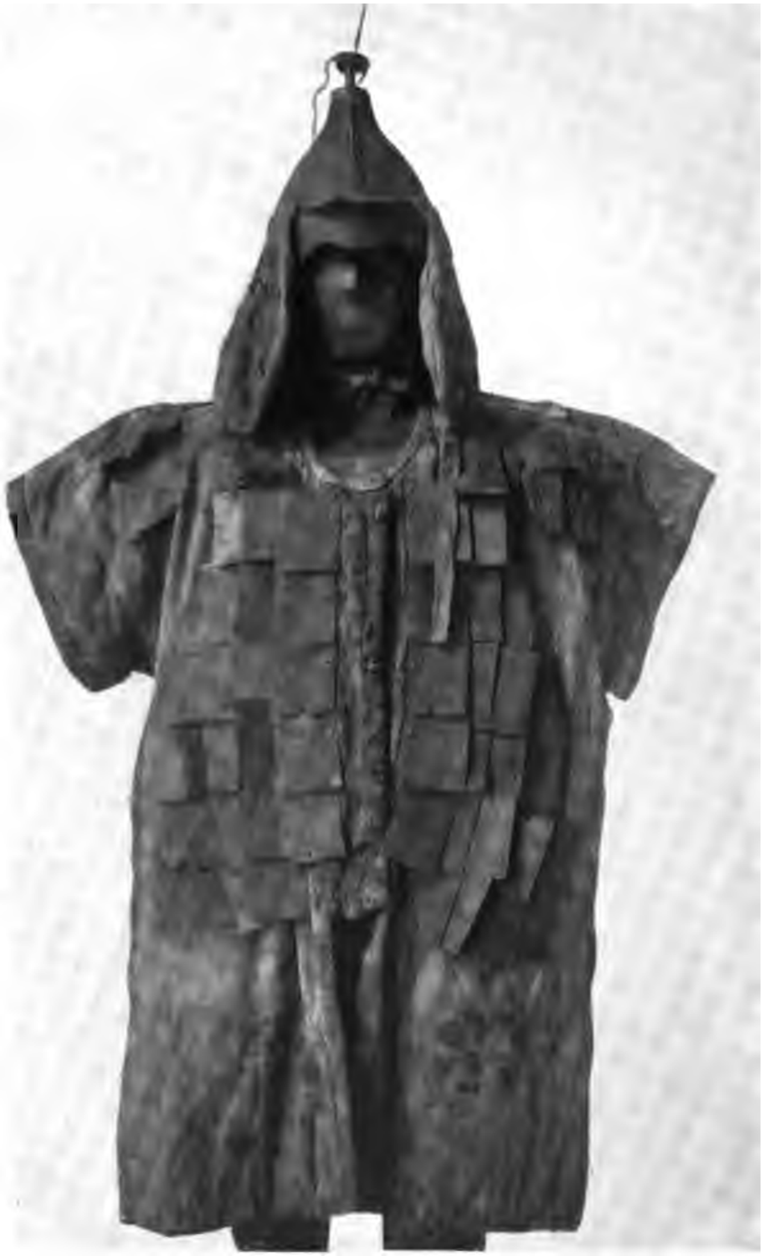
Front and back of the coat are strengthened in the interior by seven parallel rows of rectangular steel plates, coated on both sides with a black varnish.

Length, 81 cm. Cat. No. 33281.

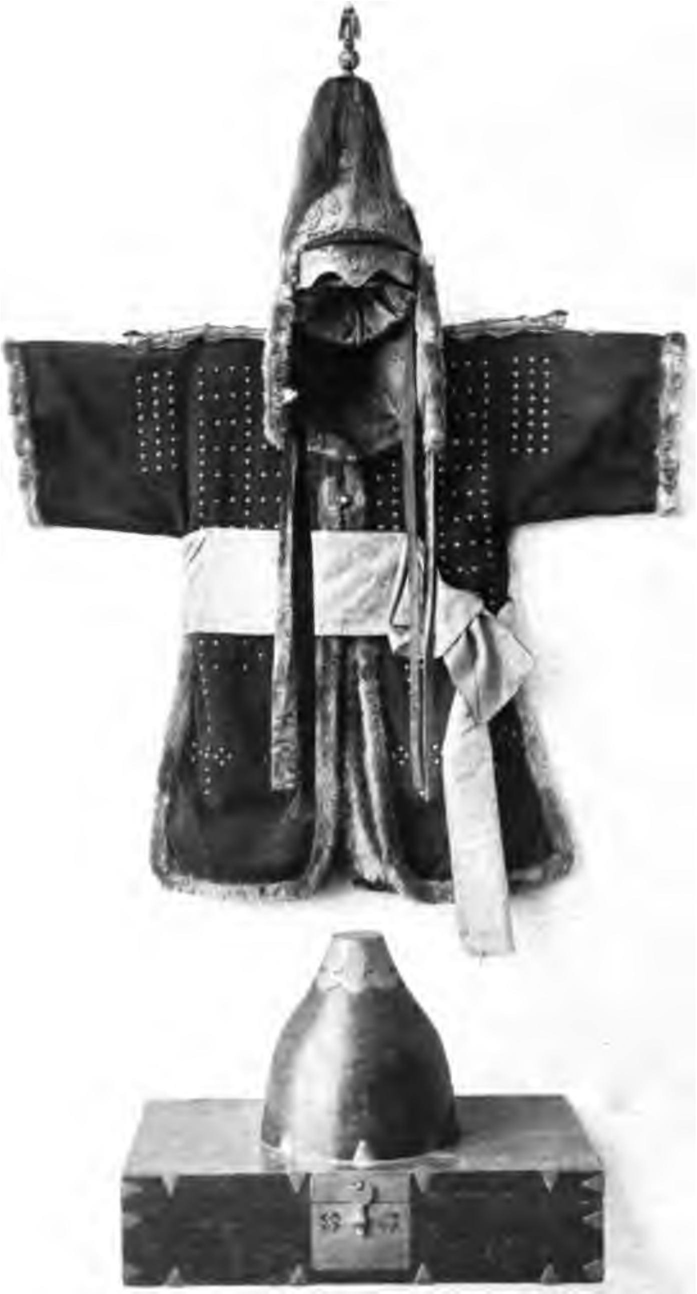
The following Plate illustrates the interior of this suit, with the iron casque.



KOREAN STEEL PLATE ARMOR, EXTERIOR.



Same Armor, Interior, with Helmet.



KOREAN COURT COSTUME OF HIGH OFFICIAL.

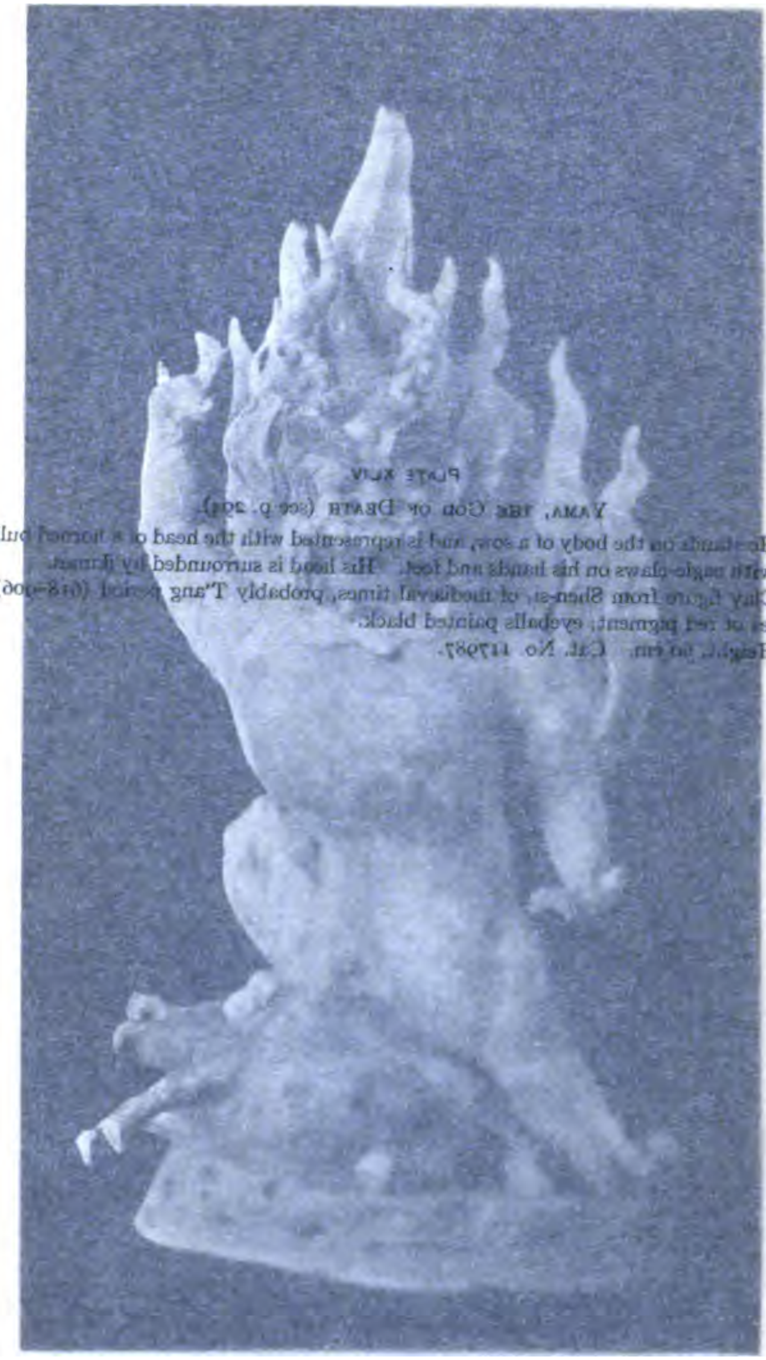
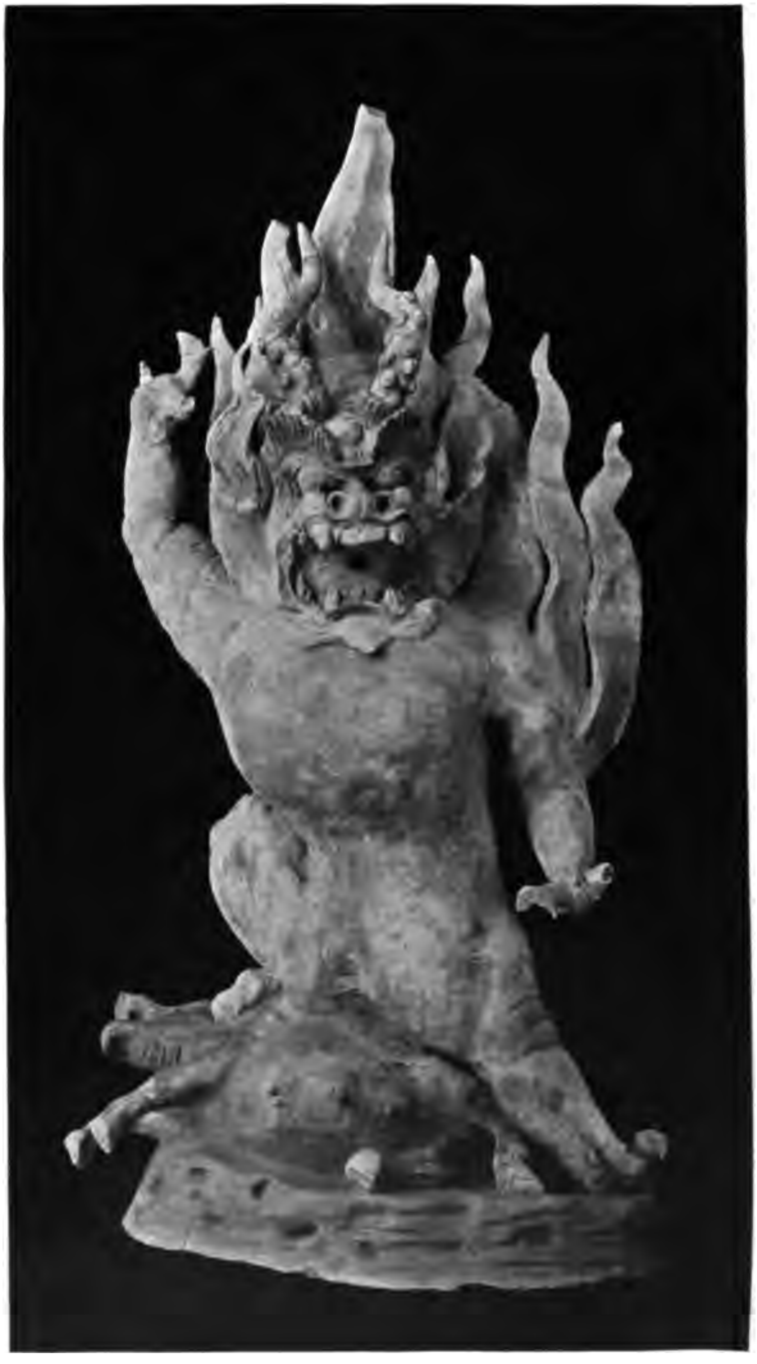


PLATE XLV.

YAMA, THE GOD OF DEATH (see p. 29

He stands on the body of a bull, and is represented with t
surrounded by flames. A snake is winding around his left a
Clay figure from Shen-si, of mediæval times, probably T
Height, 34 cm. Cat. No. 117985.



ZOÖMORPHIC FORM OF THE GOD OF DEATH.

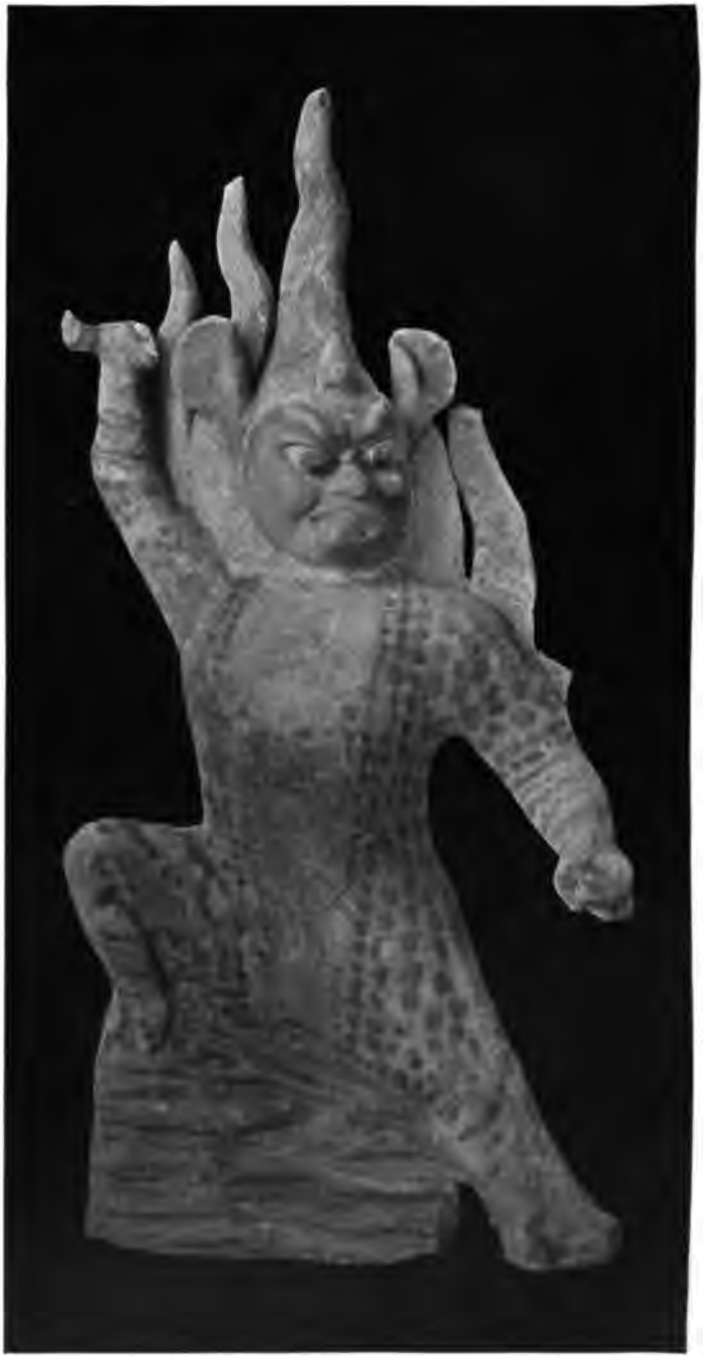
PLATE XLVI.

Yama, the God of Death (see p. 295).

In the same pose as the two preceding figures, but without a
face with human traits and animal-like ears. The head is surm
twisted horn. He is clad with a leopard-skin, indicated by row
circular spots. Face painted red; horn, eyeballs, and beard, blac

Clay figure from Shen-si. T'ang period (618–906).

Height, 47 cm. Cat. No. 117988.



ZOÖMORPHIC FORM OF THE GOD OF DEATH.

PLATE XLVII.

CLAY FIGURES FROM SHEN-SI AND HO-NAN (see p. 295).

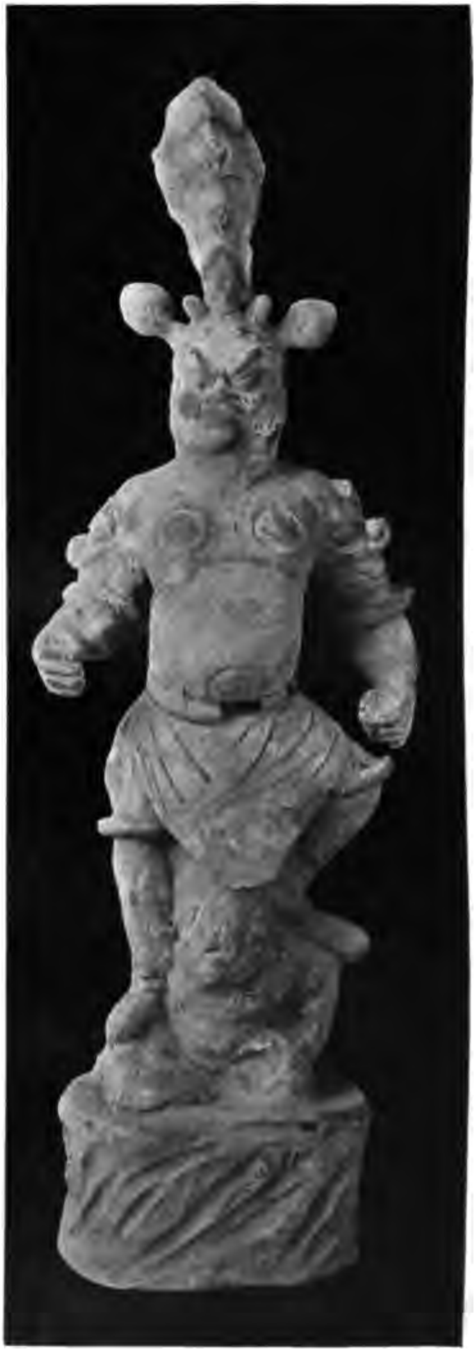
Fig. 1. Intermediary form of the God of Death. His head is modelled in the style of the bull-faced Yama as shown on Plates XLIV and XLV, but he is equipped with armor in the same manner as the human forms. He stands over the figure of a demon, and seems to have grasped a weapon in his right hand, which is perforated.

Clay figure from Shen-si. T'ang period (618–906).

Height, 45 cm. Cat. No. 117998.

Fig. 2. Fragmentary clay figure from Ho-nan, of armored knight with plumed head-dress,— a type evolved from Yama as triumphant warrior. Here inserted for comparison of the head-dress with that in Fig. 1.

Height, 31.5 cm. Cat. No. 117994.



THE GOD OF DEATH.

PLATE XLIX.

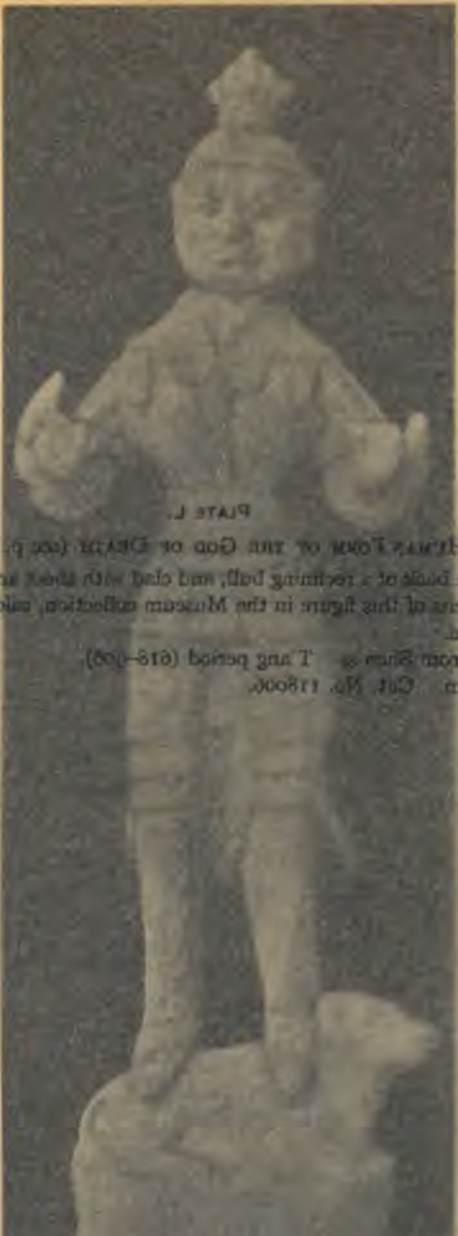
THE TRIUMPHANT GOD OF DEATH (see

He is represented as a knight with complete armor, st
demon. The figure is coated, except the head, with glaze in
brown, and yellowish white.

Clay figure from Shen-si. T'ang period (618–906).

Height, 52.6 cm. Cat. No. 118000.

FIELD M



THE GOD OF DEATH.

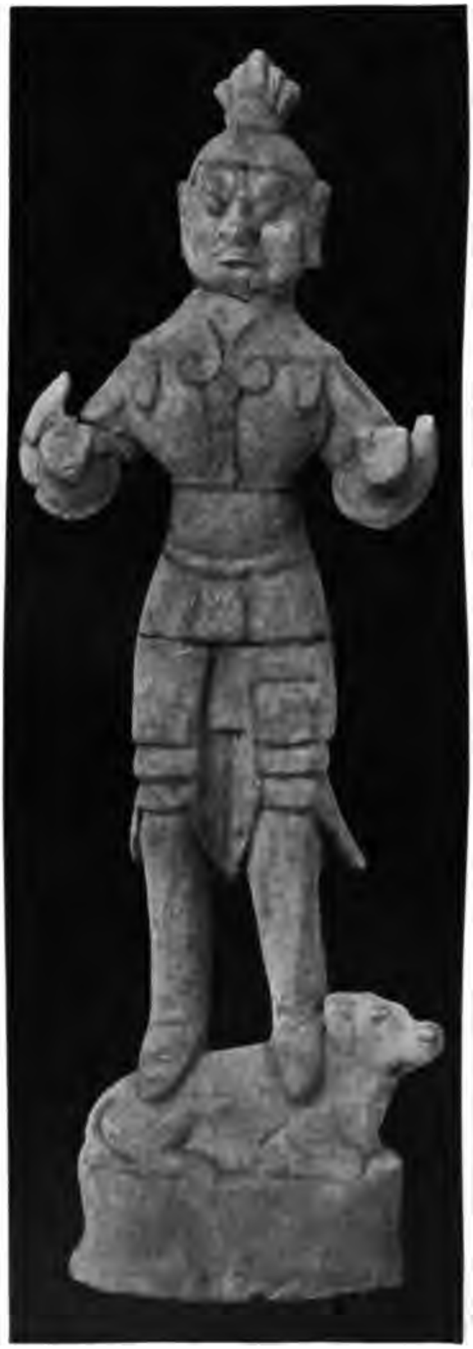
PLATE L.

HUMAN FORM OF THE GOD OF DEATH (see p. 296).

Posed on the back of a reclining bull, and clad with sheet armor. There are two identical specimens of this figure in the Museum collection, said to have been found in the same grave.

Clay figure from Shen-si. T'ang period (618–906).

Height, 67 cm. Cat. No. 118006.



THE GOD OF DEATH.

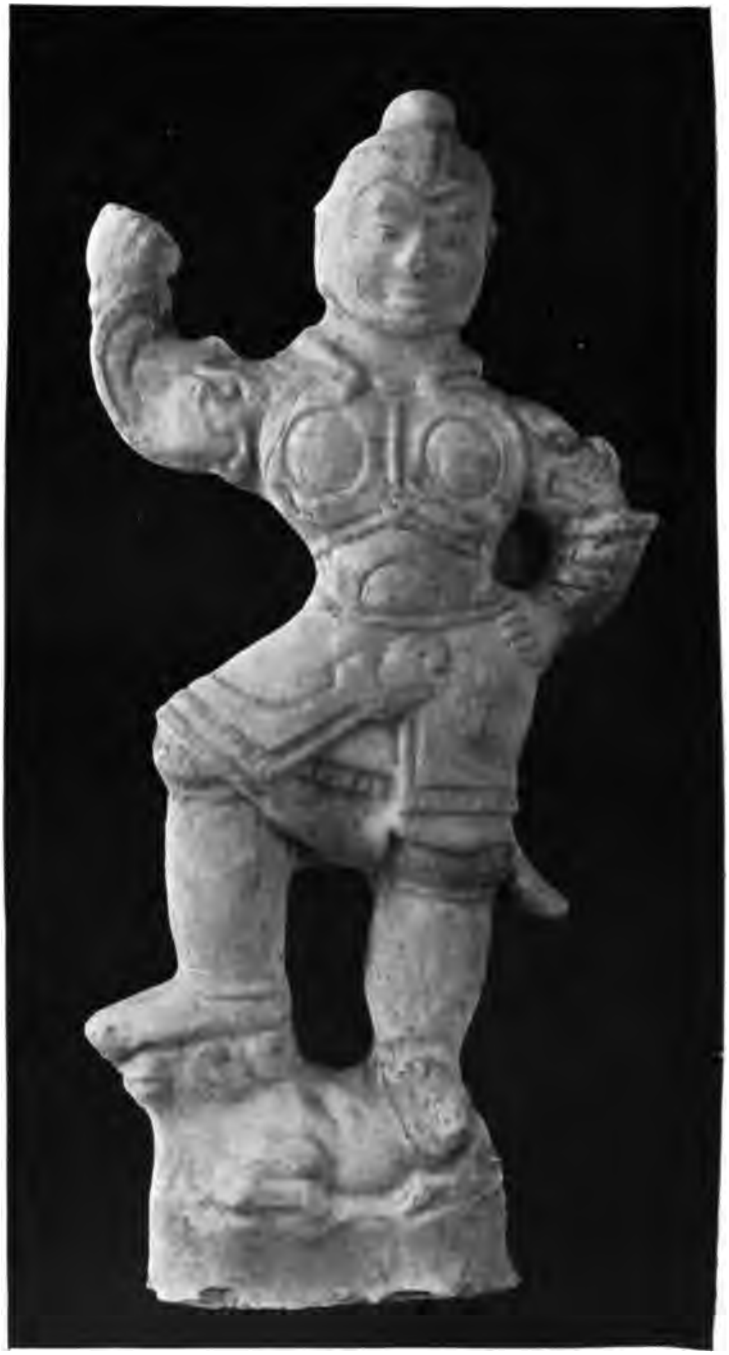
PLATE LI.

HUMAN FORM OF THE GOD OF DEATH (see p. 296).

Posed on the back of a reclining bull, and clad with sheet armor. His l
is akimbo, and his right hand is raised as though throwing a weapon.

Clay figure from Ho-nan. T'ang period (618–906).

Height, 39 cm. Cat. No. 117989.



HUMAN FORM OF THE GOD OF DEATH.

PLATE LII.

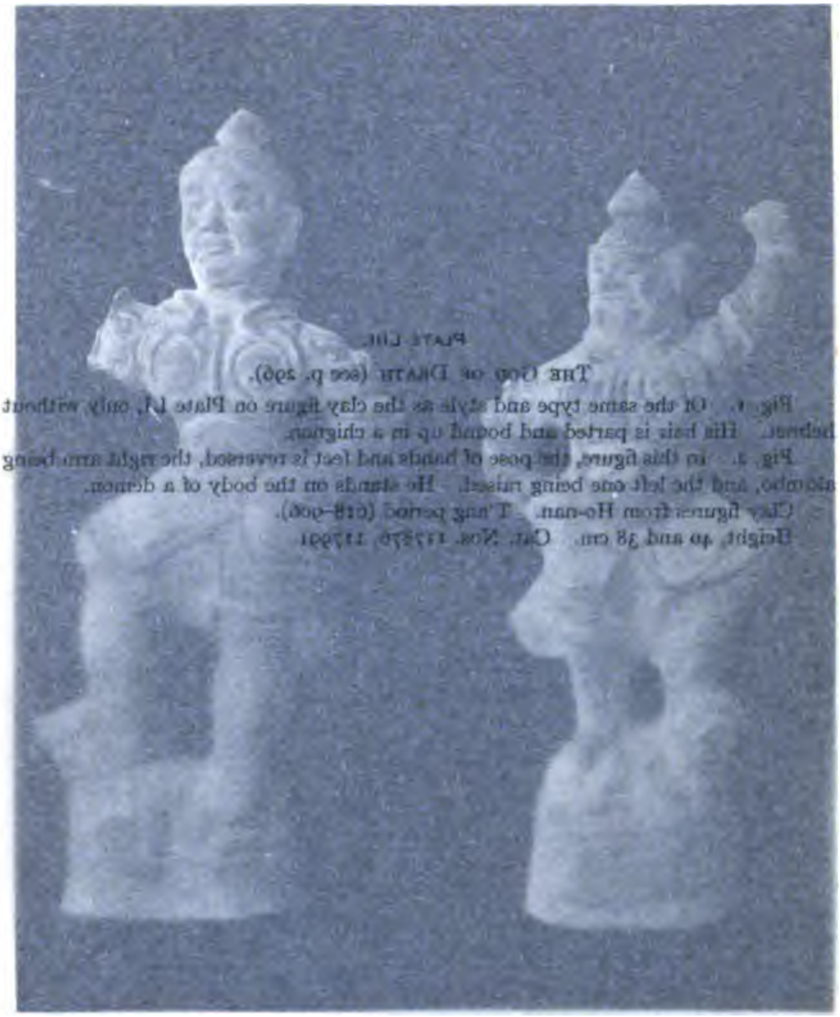
HUMAN FORM OF THE GOD OF DEATH (see

The figure of the bull is lost, but may be supplemented i figure in the preceding Plate, with which it agrees in pose an however, much more artistic. The face is well modelled and the mustache with turned-up tips. The clay piece, which app is a recent supplement. The entire clay figure, with the exc glased in three colors,— green, brown, and yellowish-white.

From Ho-nan. T'ang period (618–906).

Height, 68.8 cm. Cat. No. 118069.

FII



1

CLAY FIGURES

PLATE LIII.

THE GOD OF DEATH (see p. 296).

Fig. 1. Of the same type and style as the clay figure on
helmet. His hair is parted and bound up in a chignon.

Fig. 2. In this figure, the pose of hands and feet is reverse
akimbo, and the left one being raised. He stands on the bod

Clay figures from Ho-nan. T'ang period (618–906).

Height, 40 and 38 cm. Cat. Nos. 117876, 117991.

FIELD MUSEUM

PLATE LIV.

THE GOD OF DEATH (see p. 296).

Fig. 1. The God of Death trampling on the body of a
and pose as Fig. 2 on the preceding Plate.

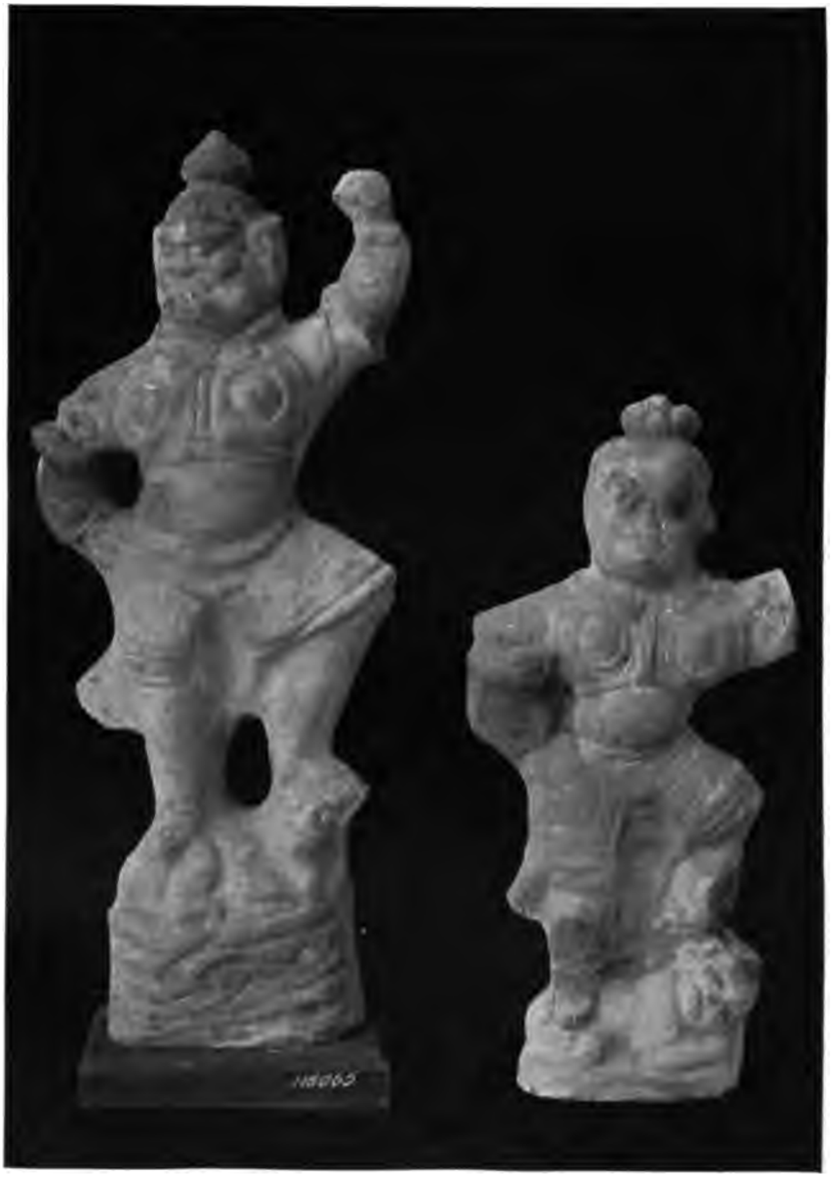
From Ho-nan. T'ang period (618–906).

Height, 38.3 cm. Cat. No. 118065.

Fig. 2. The God of Death trampling on the figure of
child), coated with a thick layer of white pipe clay,— eyes,
being painted in black; so are also the boots of the God. F
eyes are black (the eyeballs being red). The middle portion
arm is covered with a red pigment.

From Ho-nan. T'ang period (618–906).

Height, 29.3 cm. Cat. No. 117995.



1 2

CLAY FIGURES OF THE GOD OF DEATH.

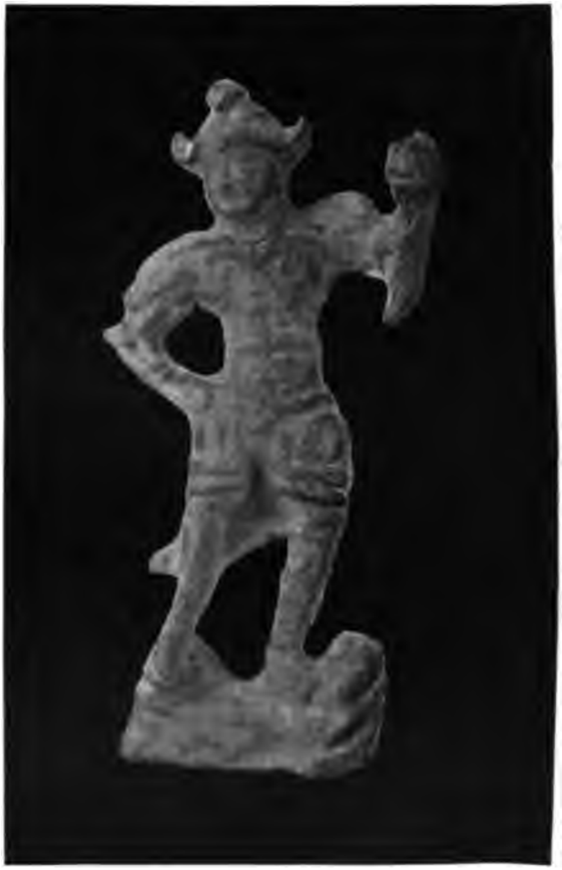
PLATE LV.

THE GOD OF DEATH (see p. 296).

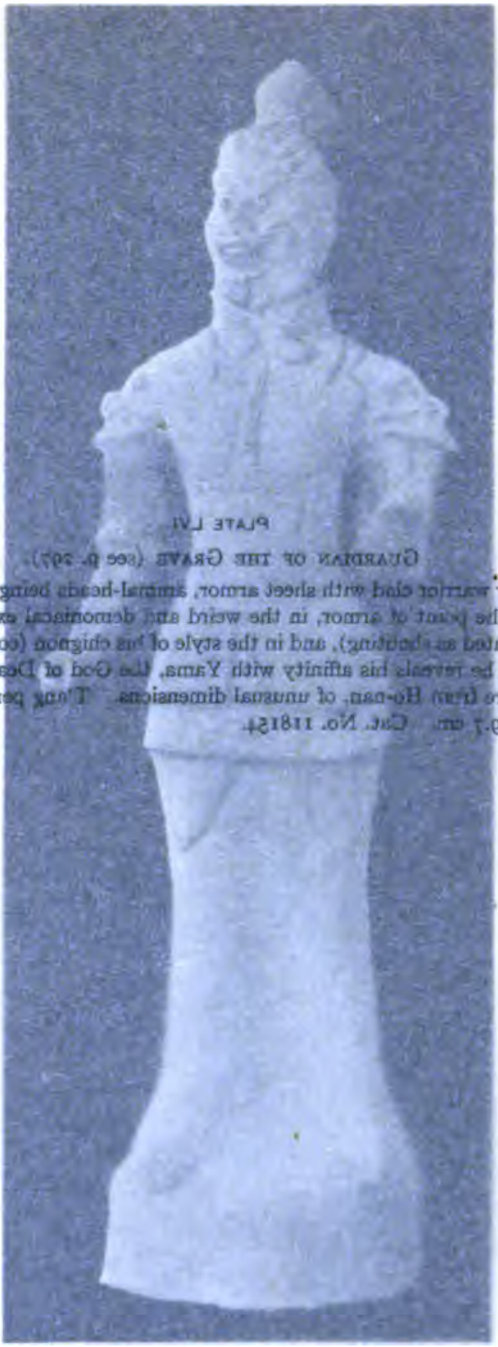
Represented as armored knight, standing on a bull or a demo
sufficiently distinct to allow of positive identification). Miniatu
from lead, in high relief; the back is flat.

From Shen-si. T'ang period (618–906).

Height, 11 cm; width, 4.3 cm; thickness, 2.2 cm. Cat. No. 1



LEAD FIGURE OF THE GOD OF DEATH.



CLAY FIGURE OF ARMORED KNIGHT

PLATE LVI.

GUARDIAN OF THE GRAVE (see p. 297).

Knight or warrior clad with sheet armor, animal-heads be
sleeves. In the point of armor, in the weird and demoniacal
(he is represented as shouting), and in the style of his chignon
LIII, Fig. 1), he reveals his affinity with Yama, the God of I

Clay figure from Ho-nan, of unusual dimensions. T'ang
Height, 79.7 cm. Cat. No. 118154.

PLATE LVII.

GUARDIAN OF THE GRAVE (see p. 297).

This figure affords a good example for the study of sheet dossière are conspicuously represented, each consisting of tw middle, and are connected by leather straps running over the s weapon in his right hand.

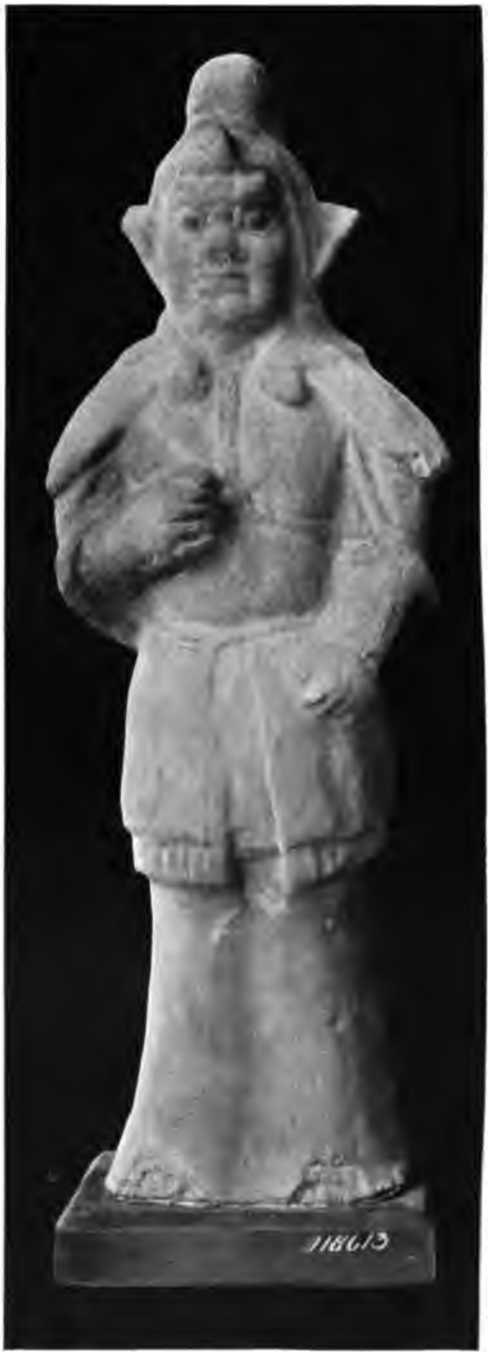
Well-modelled clay figure from Ho-nan, with traces of re riod (618–906).

Height, 61.9 cm. Cat. No. 118008.

FIELD MUSEU

PLATE LVIII.

GUARDIAN OF THE GRAVE (see p. 297
Warrior clad with sheet armor, cape, and hood
Clay figure from Ho-nan. T'ang period (61
Height, 33.6 cm. Cat. No. 118013.



CLAY FIGURE OF ARMORED GUARDIAN.

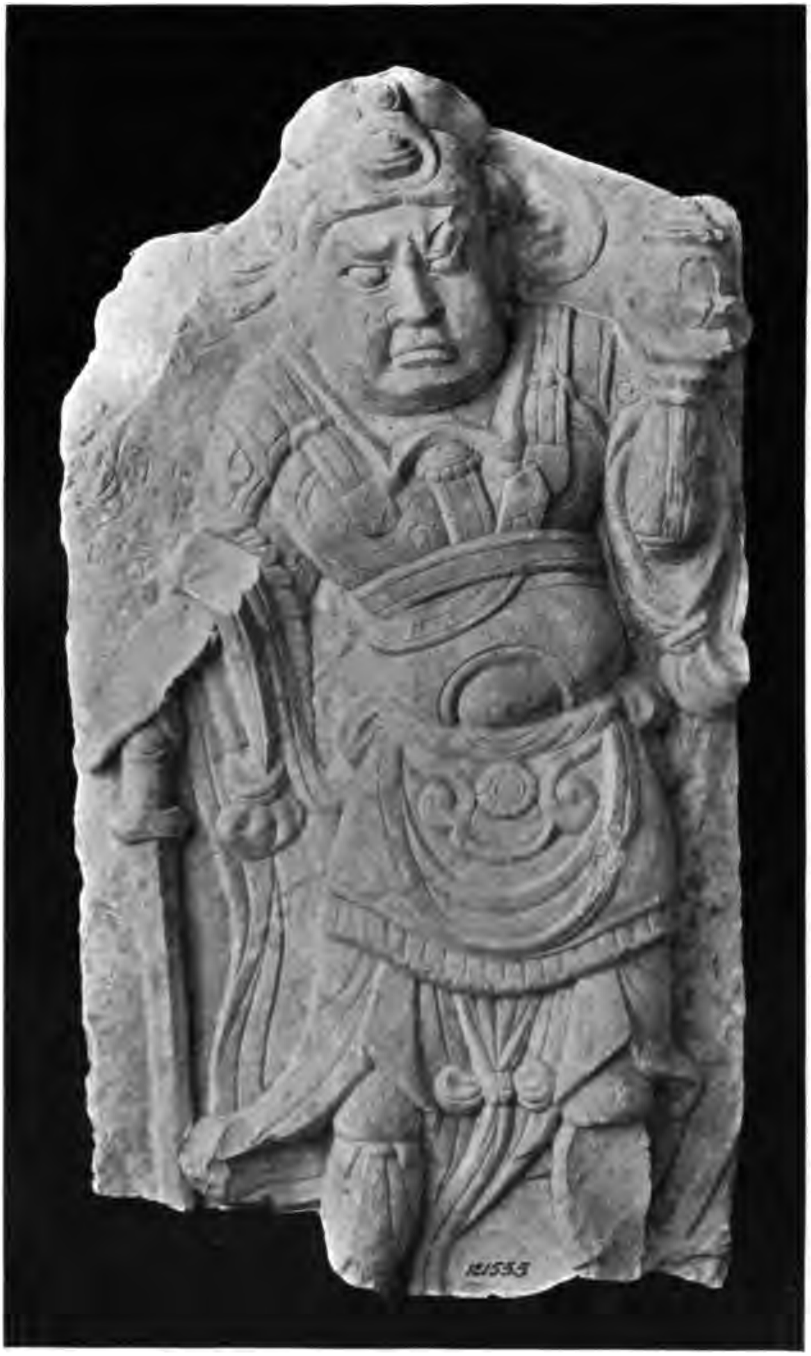
PLATE LXI.

GUARDIAN OF THE WORLD (see p. 300).

One of the four Lokapâla or Guardians of the World of Hindu mythol hold sway at the foot of the World-Mountain Sumeru. This is King Vi residing on the western side of the mountain, holding in his left hand a pagoda, and seizing a sword with his right. Here inserted to illustrate th of sheet armor in Buddhist stone sculpture with that in the preceding clay the same epoch.

Relief marble plaque, obtained from the temple King-ch'êng-se at Shen-si. T'ang period (618–906).

Height, 38 cm; width, 21 cm. Cat. No. 121555.



MARBLE RELIEF OF GUARDIAN OF THE WORLD.

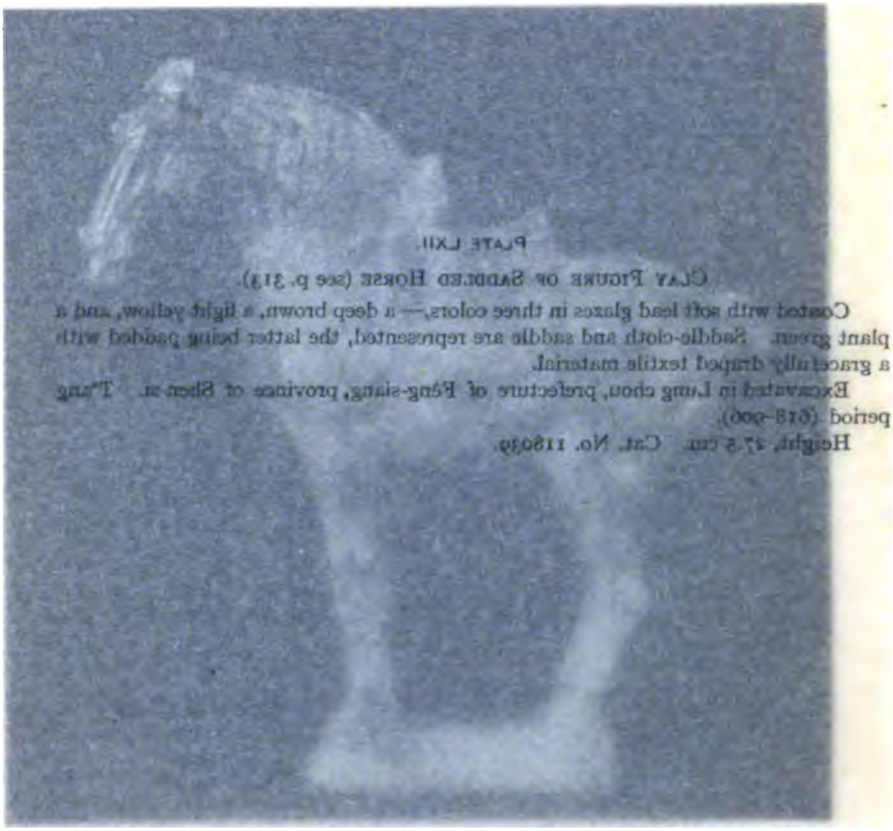


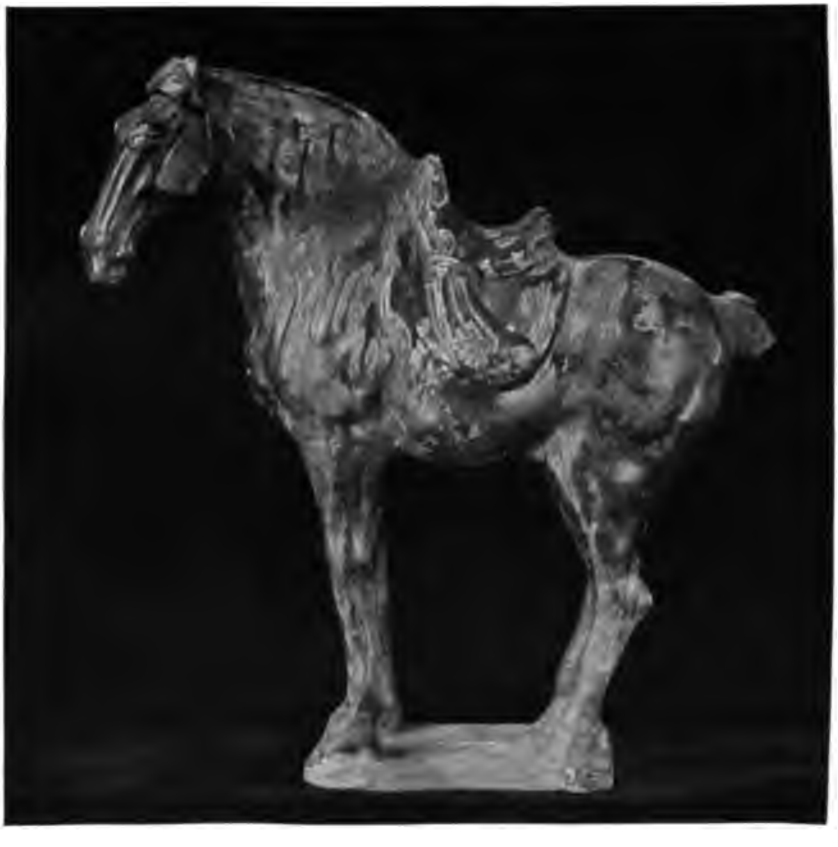
PLATE LXII.

Clay Figure of Saddled Horse (see p. 313).

Coated with soft lead glazes in three colors,— a deep brown, a light plant green. Saddle-cloth and saddle are represented, the latter being a gracefully draped textile material.

Excavated in Lung chou, prefecture of Fêng-siang, province of She period (618–906).

Height, 27.5 cm. Cat. No. 118039.



GLAZED CLAY FIGURE OF HORSE.

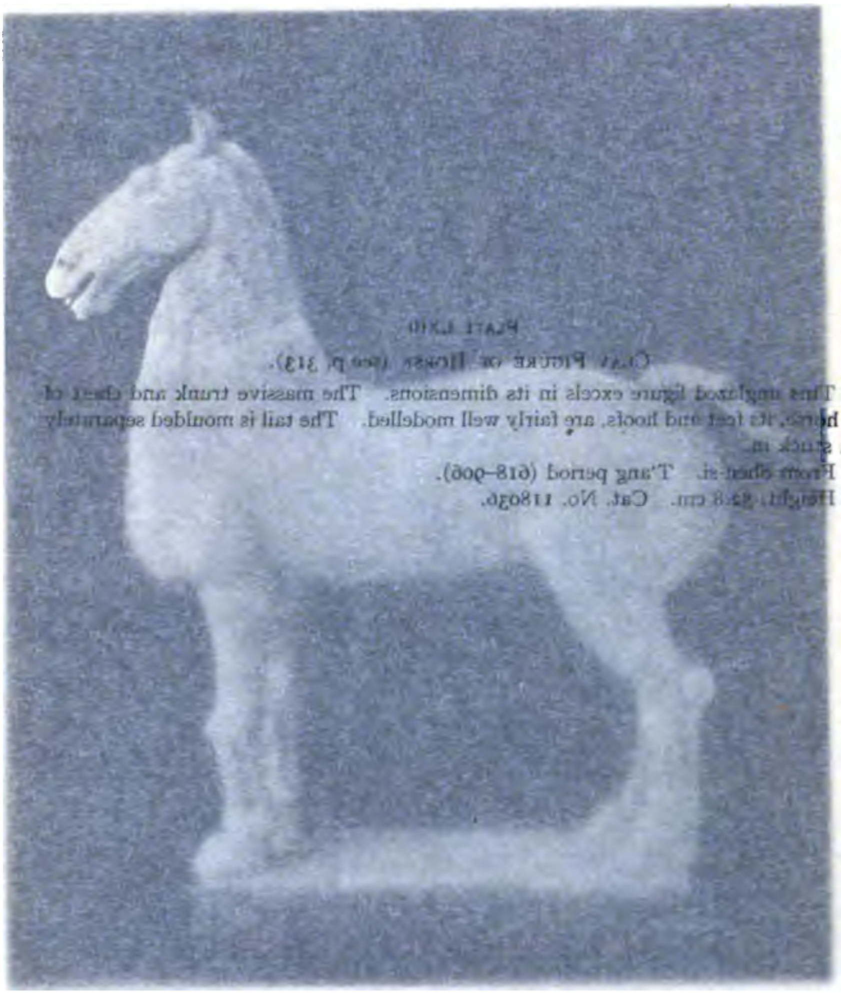


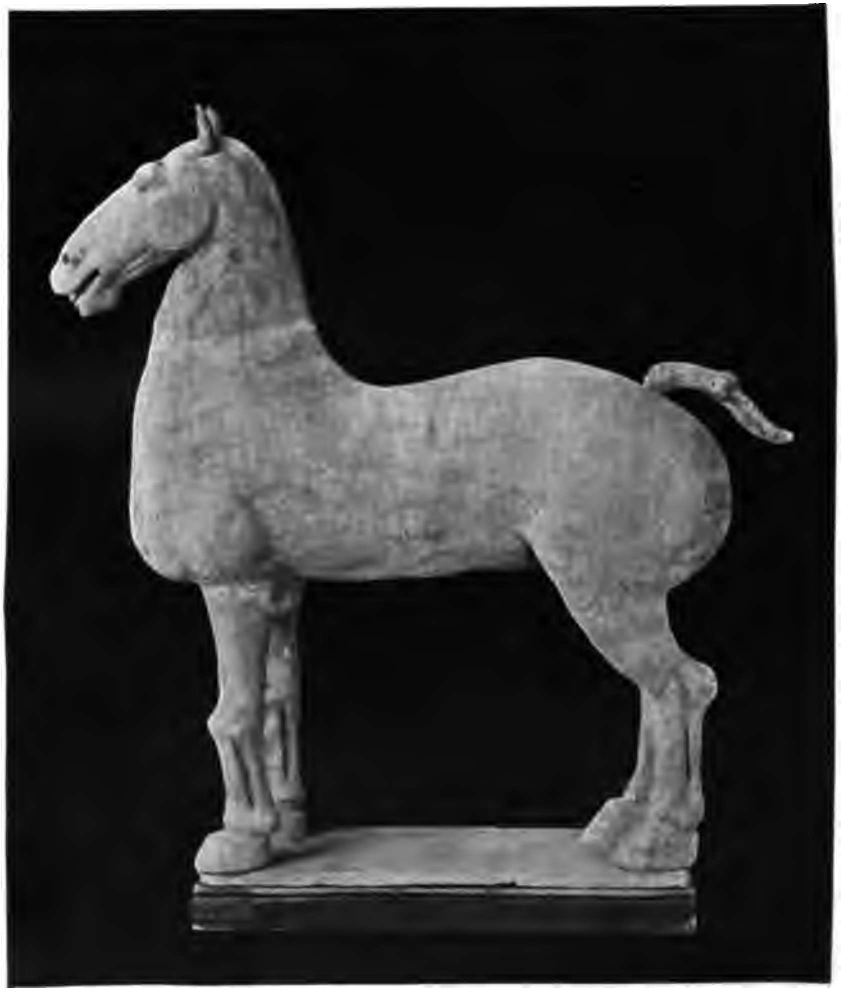
PLATE LXIII.

CLAY FIGURE OF HORSE (see p. 313).

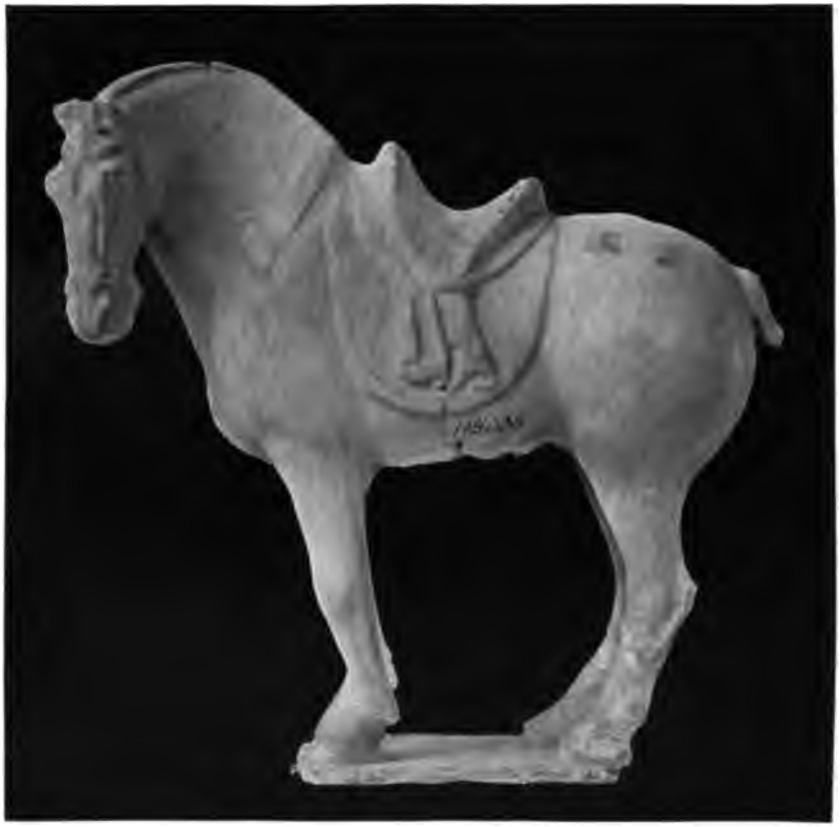
This unglazed figure excels in its dimensions. The massive trunk and chest of the horse, its feet and hoofs, are fairly well modelled. The tail is moulded separately and stuck in.

From Shen-si. T'ang period (618–906).

Height, 52.8 cm. Cat. No. 118036.



CLAY FIGURE OF HORSE, FROM SHEN-SI.



CLAY FIGURE OF SADDLED HORSE, FROM HO-NAN.

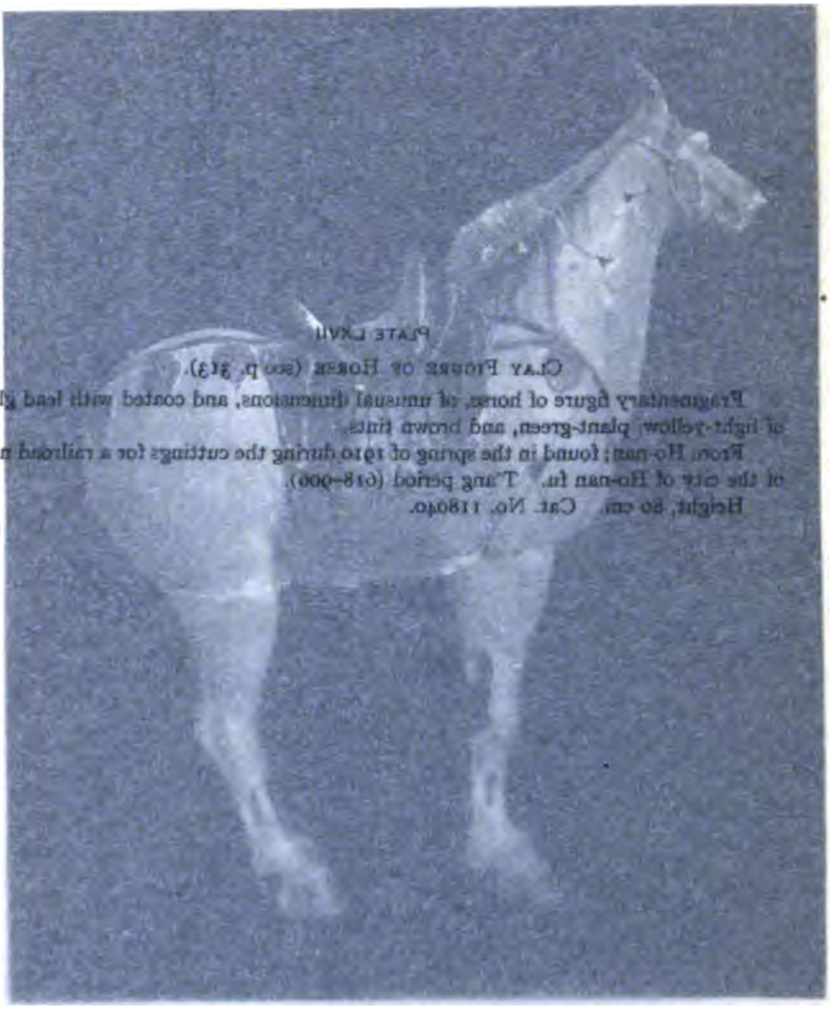


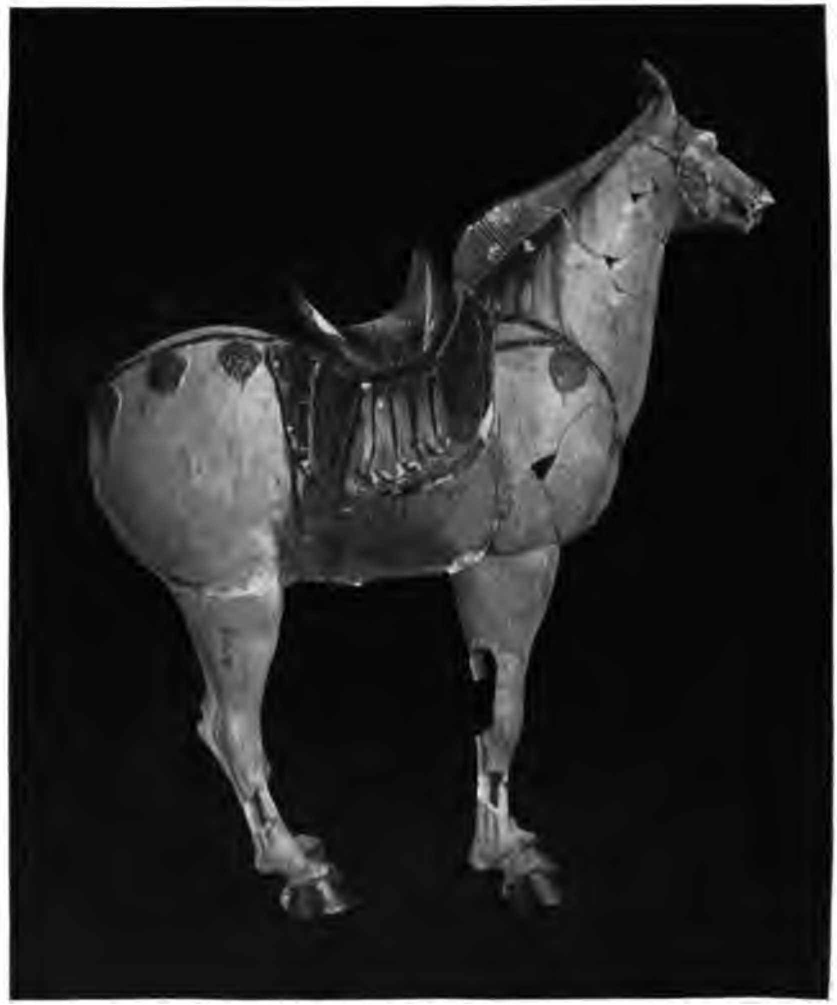
PLATE LXVII.

CLAY FIGURE OF HORSE (see p. 313).

Fragmentary figure of horse, of unusual dimensions, and coated with lead glazes of light-yellow, plant-green, and brown tints.

From Ho-nan; found in the spring of 1910 during the cuttings for a railroad north of the city of Ho-nan fu. T'ang period (618–906).

Height, 80 cm. Cat. No. 118040.



GLAZED CLAY FIGURE OF HORSE, FROM HO-NAN.

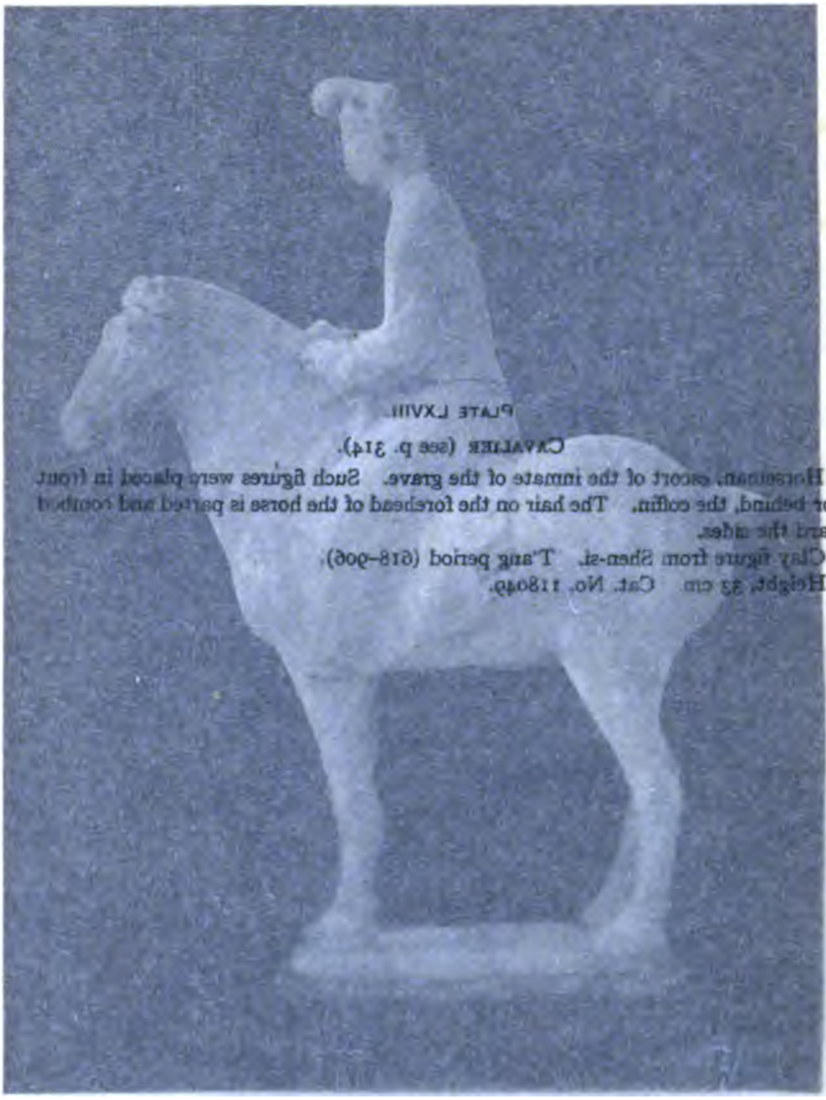


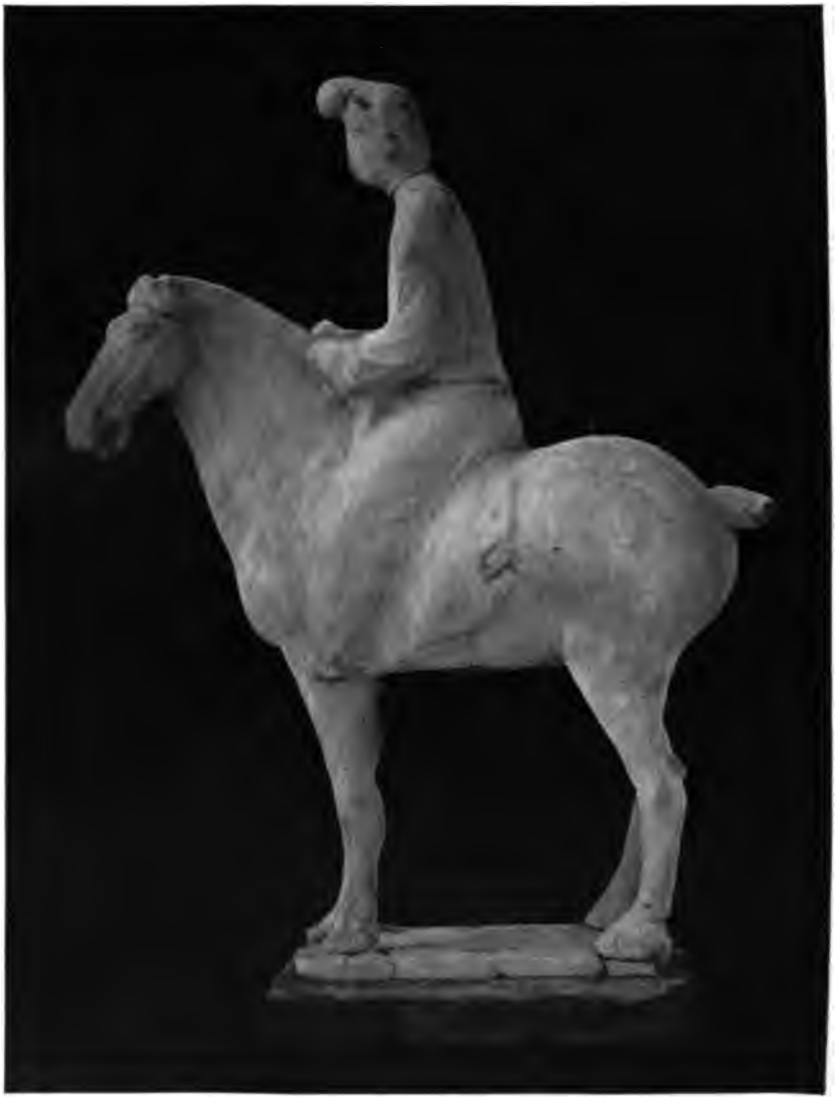
PLATE LXVIII.

CAVALIER (see p. 314).

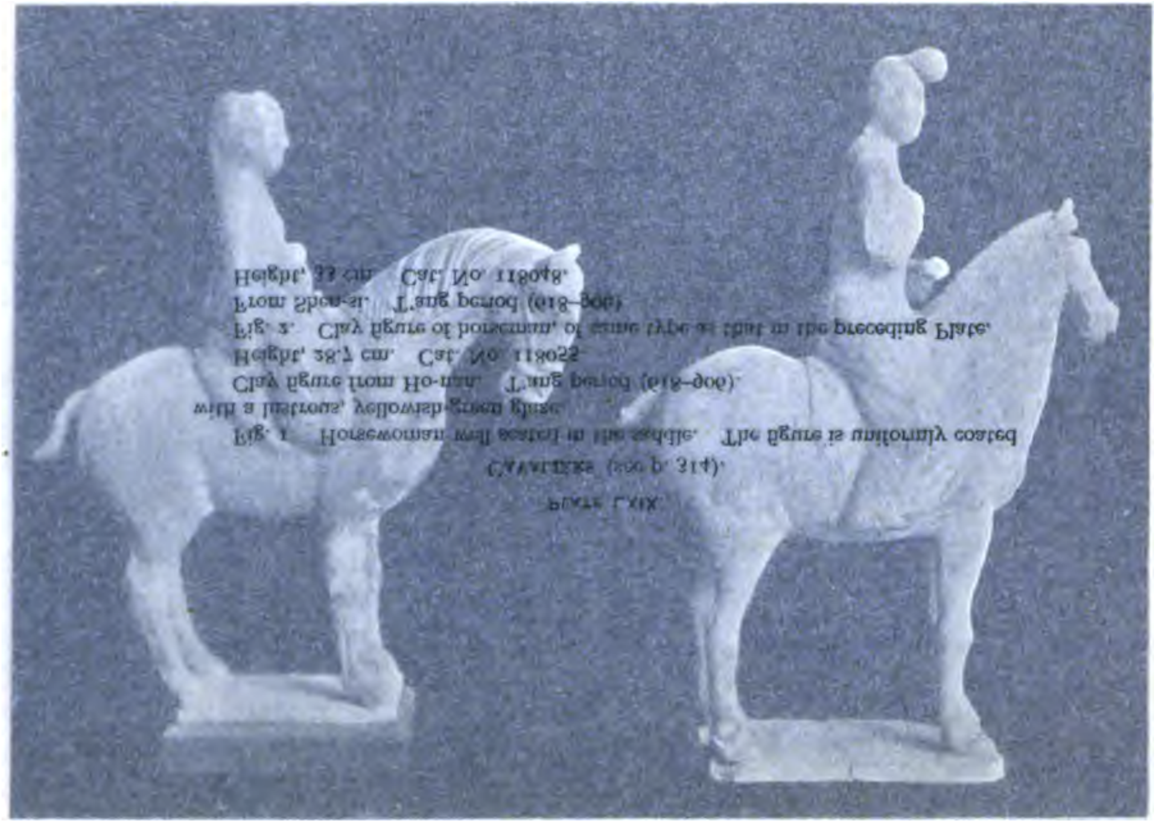
Horseman, escort of the inmate of the grave. Such figures were placed in front of, or behind, the coffin. The hair on the forehead of the horse is parted and combed toward the sides.

Clay figure from Shen-si. T'ang period (618–906).

Height, 33 cm. Cat. No. 118049.



Clay Figure of Cavalier, from Shen-si.



CLAY FIGURES OF CAVALIERS

PLATE LXIX.

CAVALIERS (see p. 314).

Fig. 1. Horsewoman well seated in the saddle. The figure is uniformly coated with a lustrous, yellowish-green glaze.

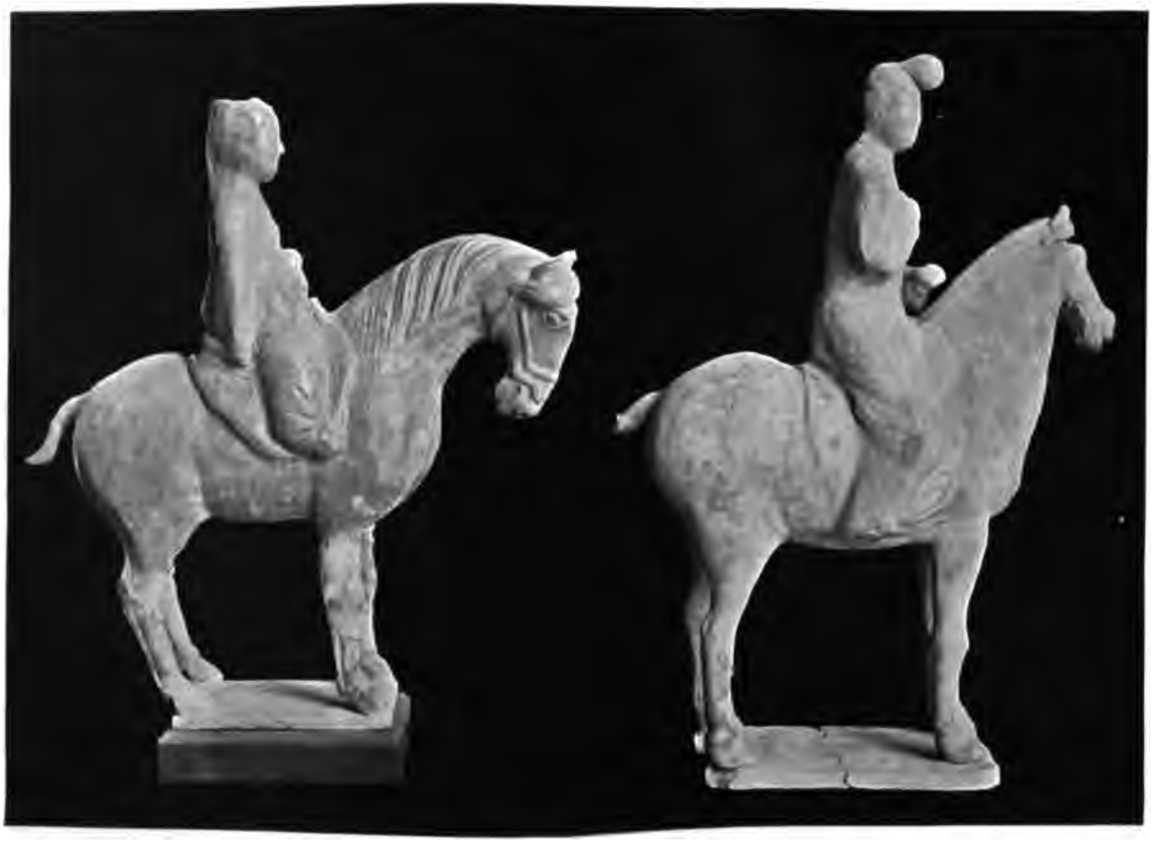
Clay figure from Ho-nan. T'ang period (618–906).

Height, 28.7 cm. Cat. No. 118055.

Fig. 2. Clay figure of horseman, of same type as that in the preceding Plate.

From Shen-si. T'ang period (618–906).

Height, 33 cm. Cat. No. 118048.



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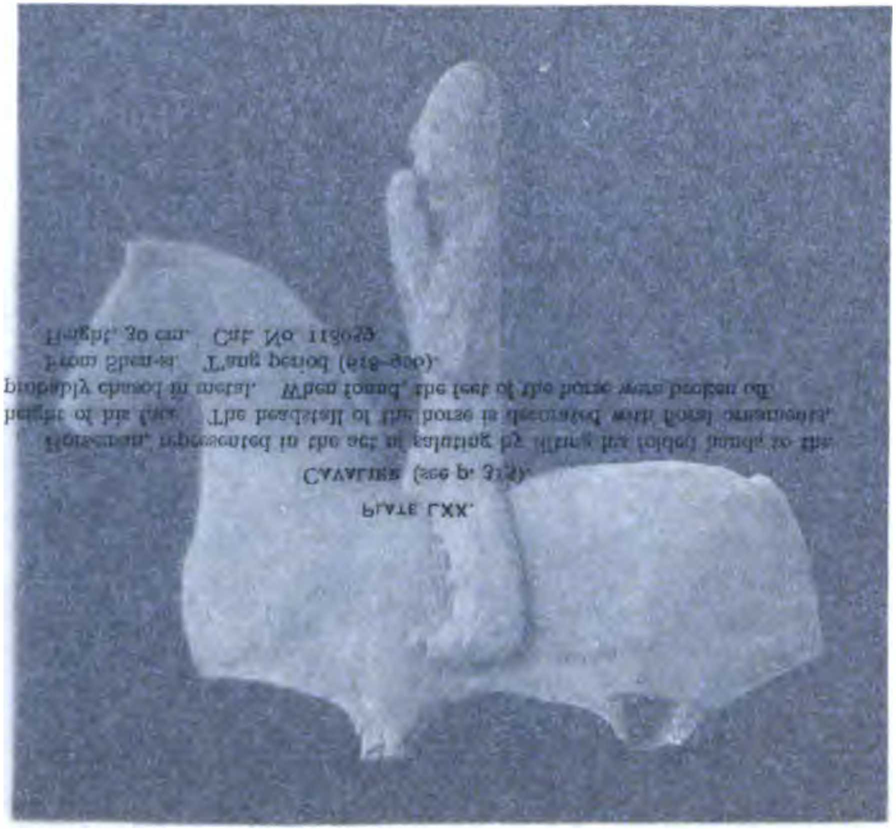
CLAY FIGURES OF CAVALIERS.



FRAGMENTARY CLAY FIGURE OF CAVALIER

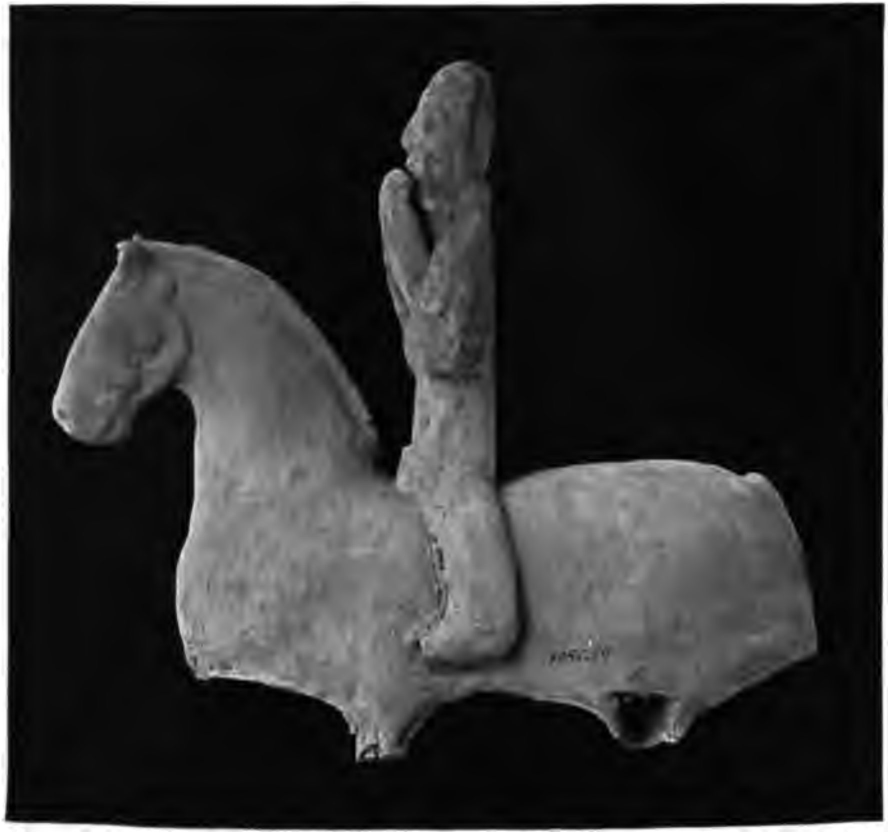
PLATE LXX.

CAVALIER (see p. 315).

Horseman, represented in the act of saluting by lifting his folded hands to the height of his face. The headstall of the horse is decorated with floral ornaments, probably chased in metal. When found, the feet of the horse were broken off.

From Shen-si. T'ang period (618–906).

Height, 30 cm. Cat. No. 118059.



Fragmentary Clay Figure of Cavalier.

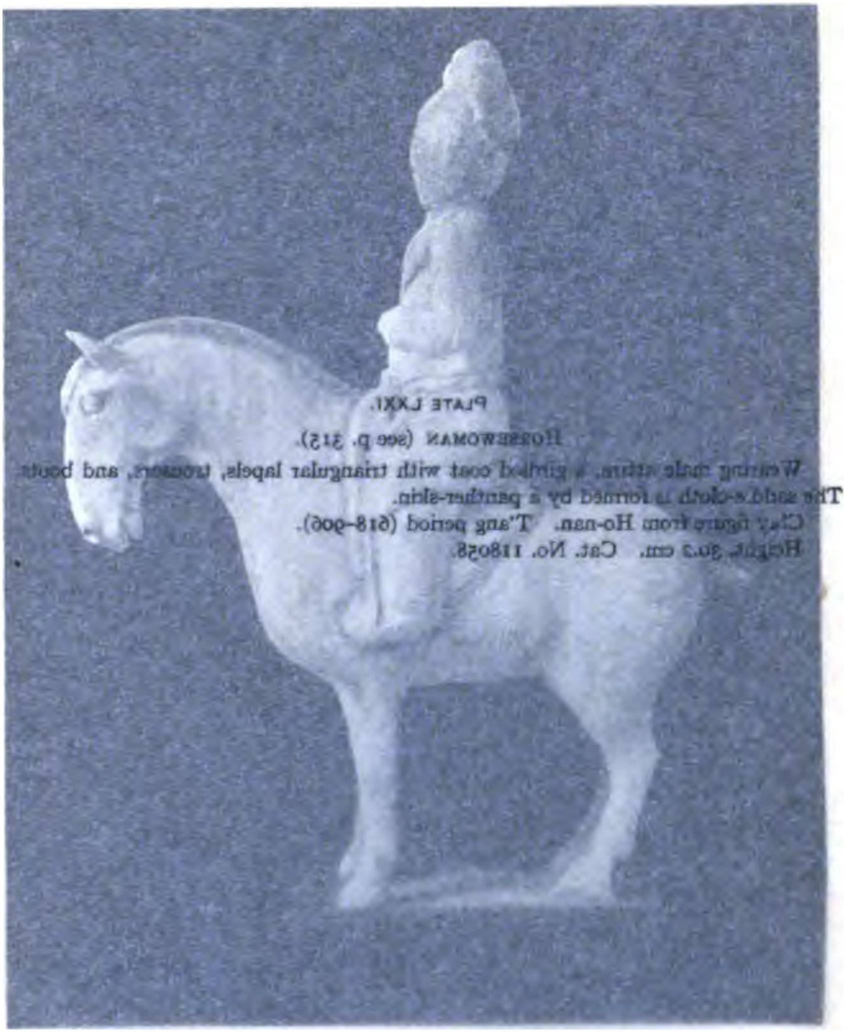


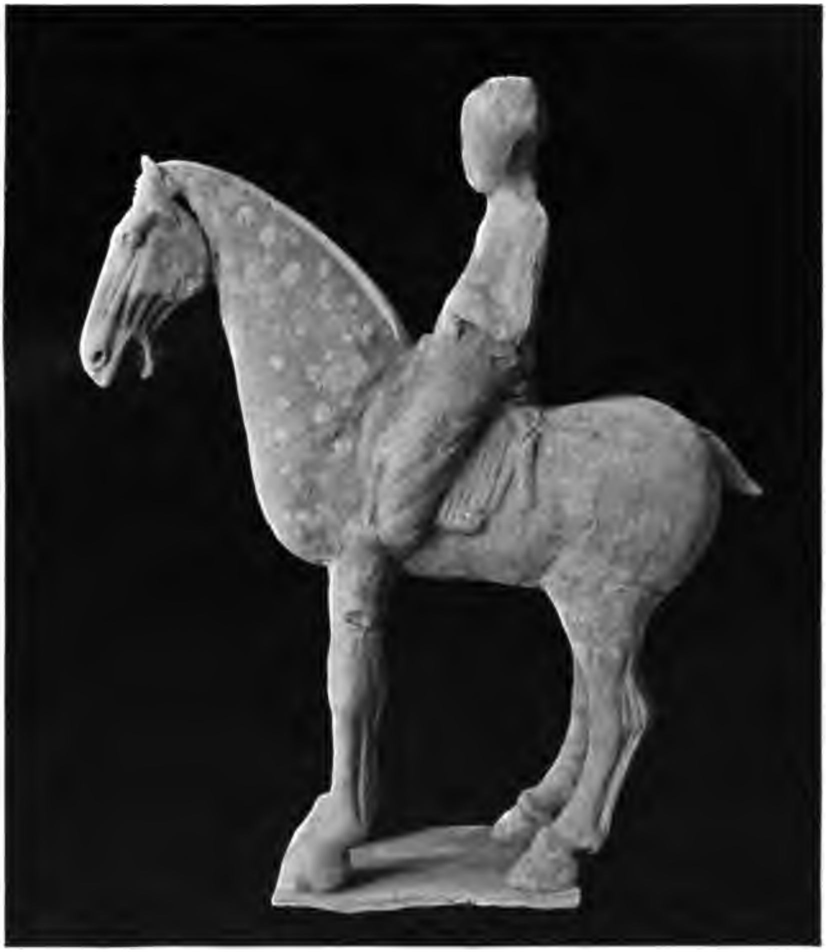
PLATE LXXI.

HORSEWOMAN (see p. 315).

Wearing male attire, a girdled coat with triangular lapels, trousers, and boots. The saddle-cloth is formed by a panther-skin.

Clay figure from Ho-nan. T'ang period (618–906).

Height, 30.2 cm. Cat. No. 118058.



CLAY FIGURE OF EQUESTRIAN WOMAN.

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